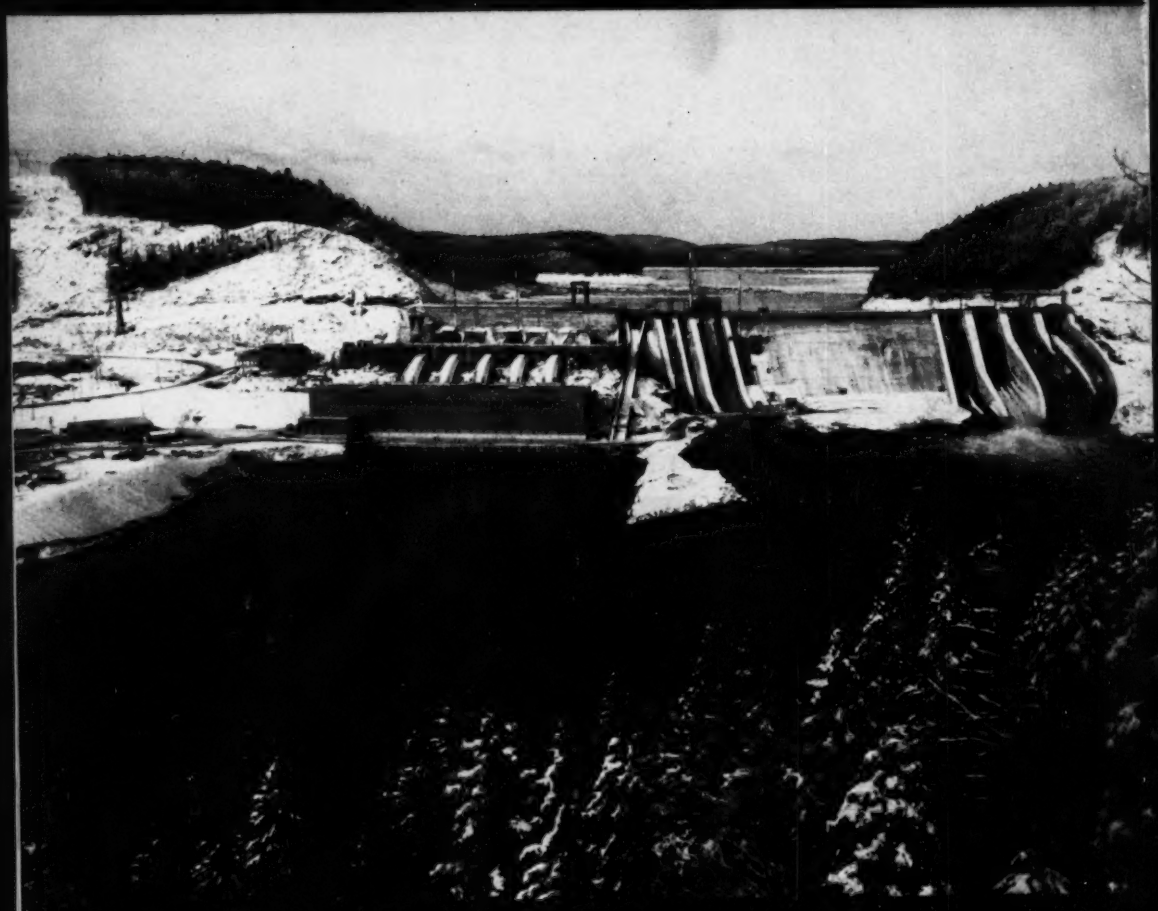
ENGINEERING NEWS-RECORD



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Ghosts and buried rain

The spectre of continuing high maintenance expense used to haunt officials of highways, railroads and airports. Usually the underlying cause was unseen and often unsuspected water lurking in the subgrades.

To banish this water permanently and economically, Armco engineers developed HEL-COR Perforated Pipe.

Made on automatic machines, this pipe meets all the needs of a first class subdrainage system. It is low in cost, easy to handle, and durable. It has ample corrugated metal strength to withstand shifting soils, frost action or the impact and vibration of heavy loads. Scientifically placed holes provide controlled infiltration areas to collect unwanted water. Subgrades become dry and stable; maintenance costs go down.

Providing better products to meet specific needs has been standard practice at Armco for more than 40 years. A few examples are Spiral Welded Pipe, FLEX-BEAM Guardrail, STEELOX Buildings and MULTI-PLATE Bridges.

Today you can bring your drainage and construction problems to Armco with full assurance you will receive all the benefits of long experience, extensive research facilities, and a real interest in helping you solve these problems.

Armco has a complete range of engineered products and convenient, authoritative data to help you. If your problem is difficult or unusual, why not talk it over with us.

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Hauling giant loads over blasted rock this B. F. Goodrich tire outlasts them all

IN ROAD contracting service in Tennessee, North Carolina and Virginia, the equipment pictured above is engaged in the tire-killing business of working its 32,000 pounds over the sharp rock of blasted terrain. Add a total load weight of 16 cubic yards of rock and earth, and it's easy to understand why bruises and blowouts make off-the-road tires a major cost item in such equipment.

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Only B. F. Goodrich off-the-road tires have the *double nylon shock shield.* (It's patented.) Layers of nylon cord, built between the tread and body plies, shield the cord body by smoothly distributing shocks and strains. This plus factor of extra mileage and service hours in BFG tires is yours at no extra cost. Then, too, because there's a specially-designed deep tread for every need, you can look forward to good traction far beyond the time when ordinary tires must be changed over to service on free-rolling wheels.

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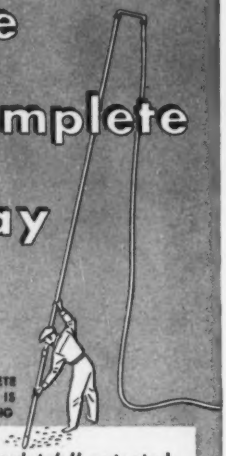

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ABP Member ABC

Volume 146 MARCH 1, 1951 No. 9

WALDO G. BOWMAN
Editor

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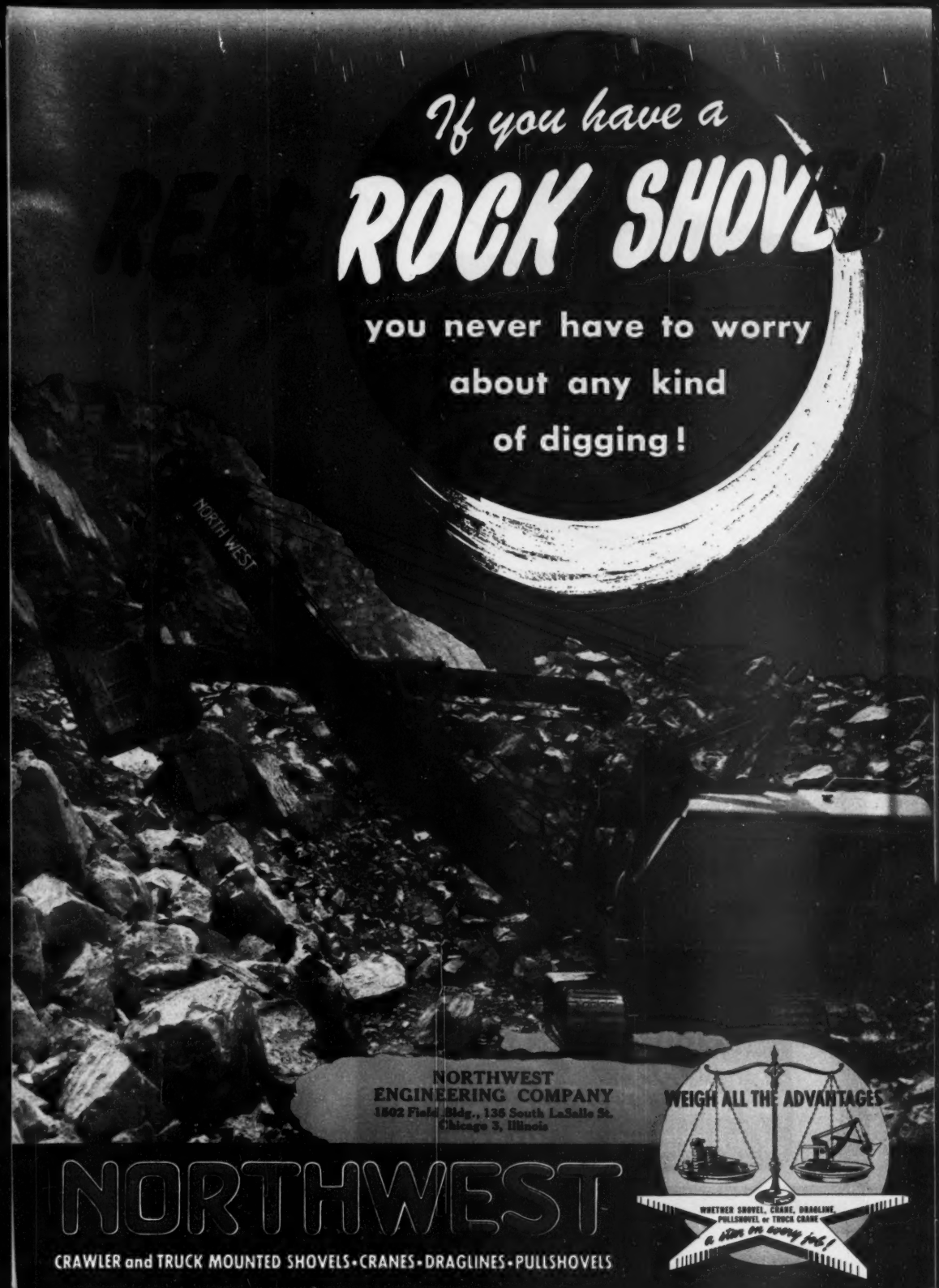
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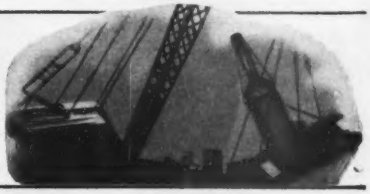

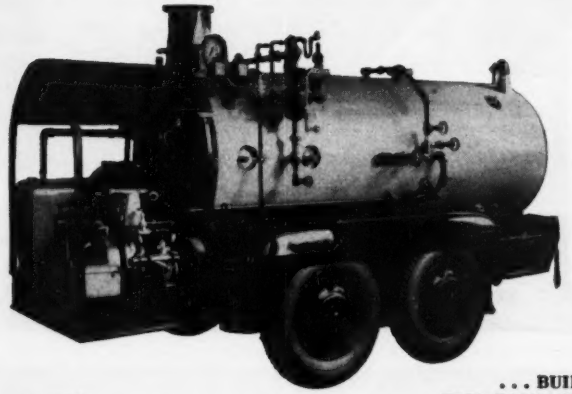

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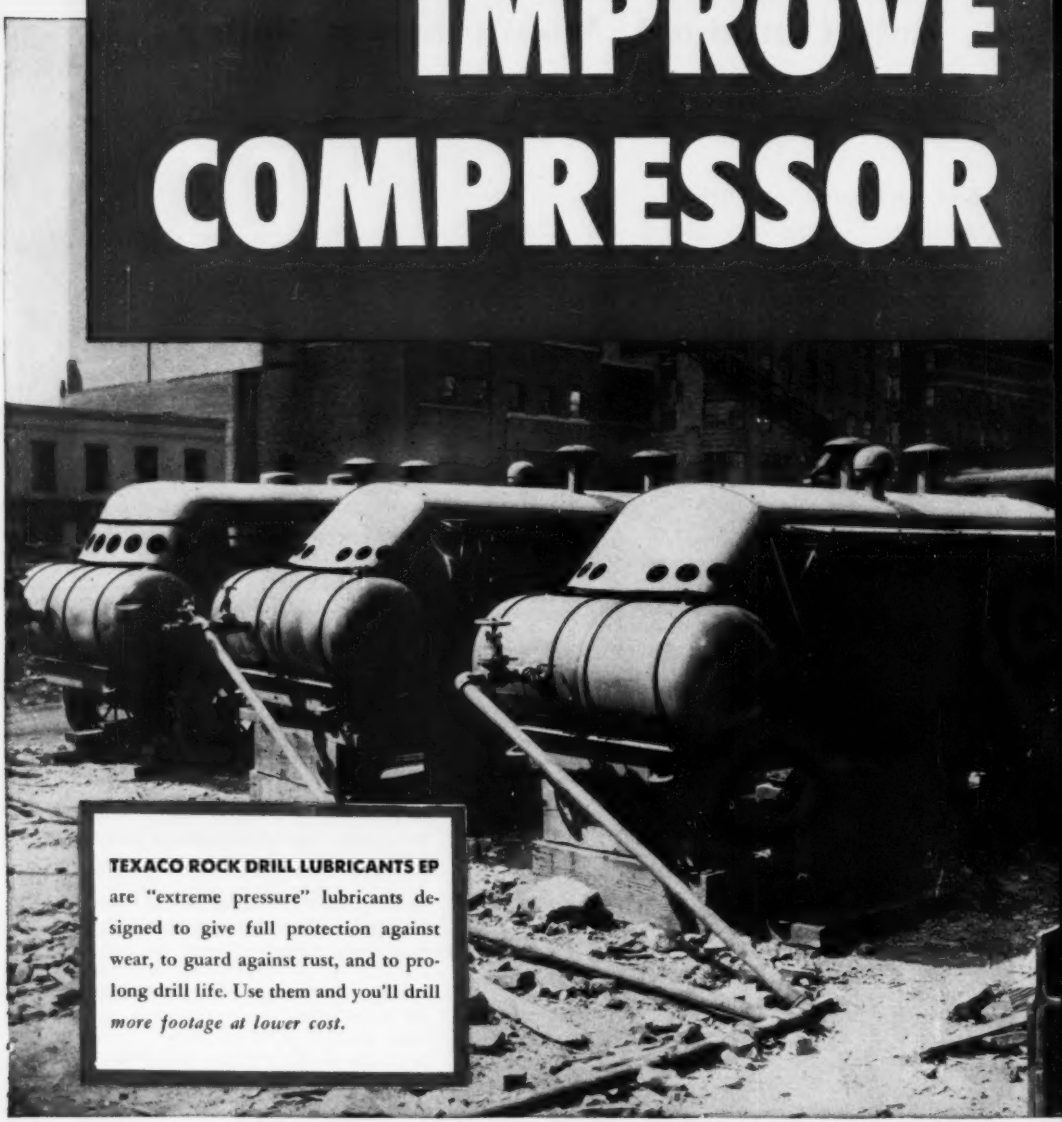

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NEWS BRIEFS

To prevent paint failures—A special citizen's committee at Seattle, Wash., has been studying the widespread paint failures in that city. This committee of painters, architects, paint manufacturers and a professor of forest products has recommended that seven changes be sought in the Seattle building code, including (1) elimination of gas-tight building paper which causes condensation inside the siding; (2) roof flashings extending 3 ft up the roof; (3) gutters installed below the ends of the shingles and 1 in. out from the building so that overflow would fall to the ground rather than backing up the roof to the wall; (4) proper flashing at the ends of gutters; (5) sealing of the soil by the use of asphalt emulsion to eliminate moisture from entering houses from unexcavated portions; (6) covering of mudsills with asphalt-impregnated paper; (7) and proper ground drainage around and under the house.

No U. S. railway in Canada—Proposals for the construction of a railway on Canadian soil to provide a link between the United States and Alaska probably will be shelved—unless the U. S. foots the bill. The Canadian government has advised the U. S. government informally that it can not allocate funds for that purpose at present. The Magnussen bill, which was passed by Congress in 1949, authorized the U. S. government to seek an agreement with Canada for a location survey for this rail connection. The official statement of External Affairs Minister Pearson, of Canada, says that "The Canadian authorities have been surveying the possibilities and were impressed by the high costs of such a project in relation to the expected volume of civilian and military traffic in the near future. There is no indication that the view of the United States authorities differs substantially from ours as to proceeding with this."

Home-building worries—A joint committee of the Producers' Council and the National Association of Home Builders has been formed to analyze problems arising from the defense emergency which are of mutual interest to building products manufacturers and home builders. The committee will study the future availability of critical and non-critical materials to see what can be done to permit the maximum amount of residential building with the available supply of materials and equipment.

(Continued on page 10)

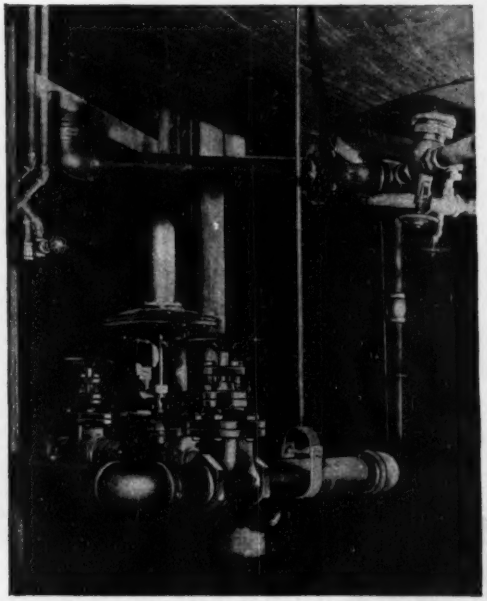
in the

MOST ADVANCED buildings

such as at . . .

JENKINS VALVES

are just what the doctor ordered



Valves for fermentation tank are among the thousands of Jenkins Valves installed in the 135 buildings of Lederle Laboratories' main manufacturing plant at Pearl River.

In its modern, integrated plant at Pearl River, N. Y., Lederle Laboratories Division, American Cyanamid Company, has as rigid a set of controls for the preparation of drugs, antibiotics, and biological products as any commercial laboratory in the world.

All operating equipment for processing of the various products must be thoroughly dependable. It will be no surprise to future-minded building planners that Jenkins Valves passed this "laboratory test" and are standard throughout the Lederle plant.

Jenkins Valves have been the choice, consistently, of leading architects, engineers and contractors for America's most progressive buildings—the skyscrapers, industrial plants, institutional and municipal structures that have set new standards in operating efficiency as well as design.

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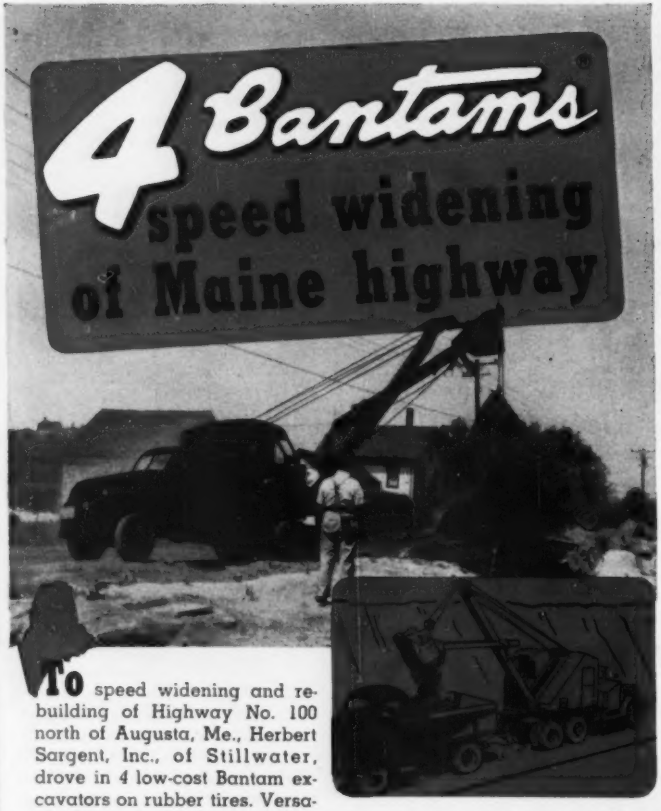

To speed widening and rebuilding of Highway No. 100 north of Augusta, Me., Herbert Sargent, Inc., of Stillwater, drove in 4 low-cost Bantam excavators on rubber tires. Versatile 35 m.p.h. Bantams quickly paid off by making money on dozens of *"work-and-run"* jobs, where it formerly cost more to move big equipment in and out than it did to do the work. Bantams saved time handling blasting mats (as illustrated) . . . cut cost of loading fill, aggregate and blasted rock . . . made fast changes from ⅜-yd. shovels to trench hoes for digging drainage ditches and water lines. You, too, can save time and money with Bantams . . . ask for demonstration!

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Substandard houses—The Housing Commission of Detroit, Mich., after a survey, reports unsatisfactory housing conditions. Substandard houses are occupied by 250,000 persons, while about 500,000 are living in homes where some conditions are substandard. Substandard dwelling units are defined by the commission as houses more or less dilapidated or with no running water, baths or toilets inside. Substandard conditions occur when more than one family uses facilities meant for one.

Erosion survey—A committee has been formed to study erosion along New Hampshire's 18-mile sea front. It is headed by Alvin F. Redden of Portsmouth. Twenty members will form the group, which will cooperate with the New Hampshire Forestry and Recreation Commisison and consider long range developments and protection of rivers, harbors and bays, as well as the ocean front.

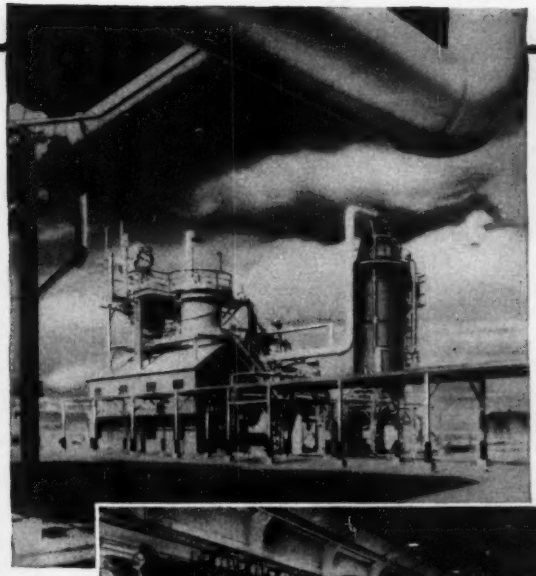
No superhighways—A $9,000,000 project for a superhighway in Prince Georges County, Md., under consideration for five years, has been discarded by the county commissioners as "entirely too expensive" under present conditions. The highway was planned to extend from Takoma Park to the proposed Annapolis freeway near Ardwick—a distance of 8 miles.

Cooperative power project—Quebec's first cooperative hydro-electric unit was opened recently in one of the more isolated sections of the province. It is in Chicoutimi County and serves the parishes of Petit Saguenay and Anse St. Jean. It generates only 300 hp. Transmission and distribution lines total 41 miles and serve 235 users. Members subscribed $28,000, and $137,000 was granted by the Provincial Rural Electrification office.

Safety first for children—One of the worst street intersections in Florida for school children to cross has led to one of the best safety precautions in the state. Many pupils of Concord School, Orlando, had to cross railroad tracks, a busy U. S. highway and a new cross-state highway. Concern of parents for the safety of their children led to construction of three concrete underground passageways at that place. The work cost $58,539, but parents think it is worth that if it saves only one child's life.

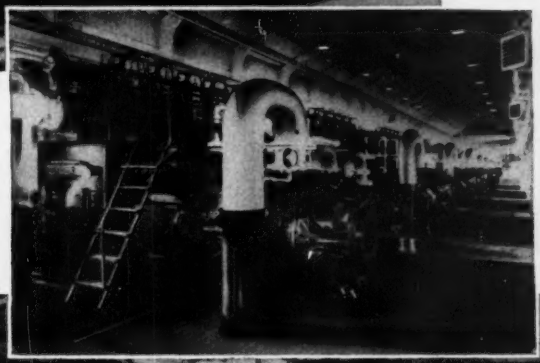
Premium on training—When Jacksonville, Fla., failed to receive any applications for the $350 per month job of office engineer in its building de-

(*Continued on page 13*)



NOTHING IS WASTED

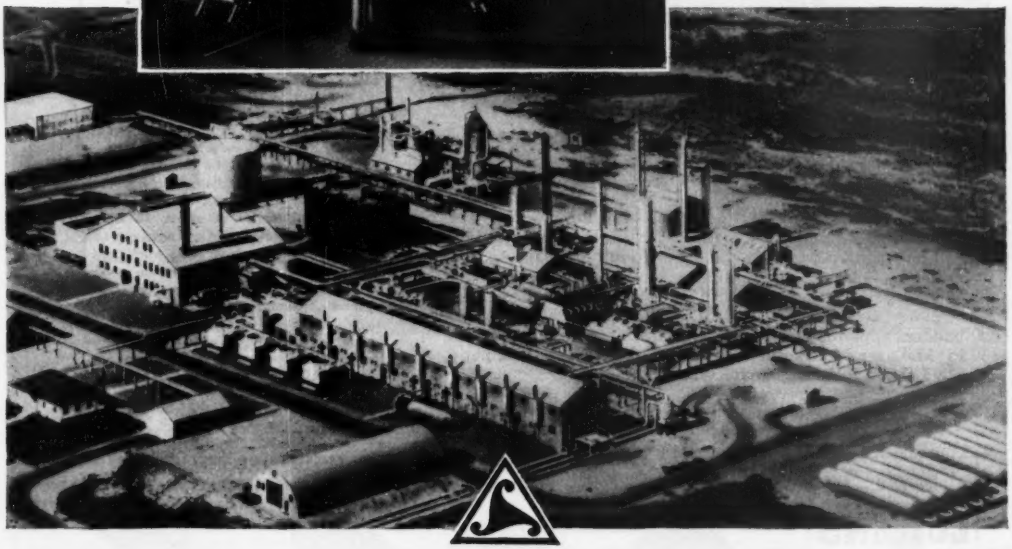
To insure maximum use of the field, the new Elk Basin Unit Repressuring Plant at Elk Basin, Wyoming, includes provision for recovery of over 90 per cent of pure elemental sulfur from sour gas and the generation of flue gas for repressuring. This releases the sweetened natural gas for sale purposes. Operated for the Unit by Stanolind Oil and Gas Company, the plant recovers propane, butane and natural gasoline from casinghead gas. Design and construction were by Stone & Webster Engineering Corporation.



Above: Sulfur Recovery Unit.

Center: Interior of Compressor House showing feed and inert gas compressors.

Below: General aerial view of plant.



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or Venturi Tubes...

Whether it's a mechanical or civil engineering project, equipment can be a problem . . . especially today, if it requires hard-to-get metals.

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One way such equipment builders protect their customers' equipment investment is the application of the *Lukenomics* principle. For Lukenomics combines their experience and that of designers and engineers, with Lukens specialized knowledge of materials and their application. For names of equipment builders applying this principle, write, stating your problem, to Manager, Marketing Service, Lukens Steel Company, 513 Lukens Building, Coatesville, Pa.

For accurate regulation of fast-flowing, debris-laden water in a key dam, four specially designed Venturi tubes of Lukens Nickel-Clad Steel were developed. For maximum discharge, these Venturis have exceptionally high throat velocities and a differential pressure of about 22 ft. of water between inlet and throat. In use, the Venturis' nickel surfaces have work-hardened and, after 14 years of accurate metering with minimum maintenance, operation is more efficient than when installed. By using nickel-clad steel, the equipment builder economically assured long equipment life—helped conserve important materials. *This is Lukenomics at work.*

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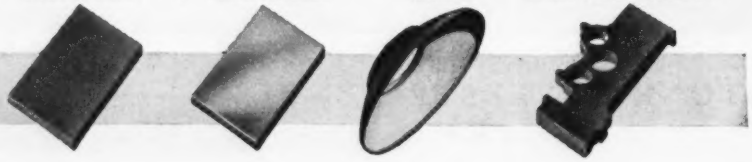

partment, the city commission removed a requirement that applicants hold an engineering license. However, dropping of the license requirement provoked formal protests from professional engineers, so the commission restored the requirement and raised the salary to $450 per month.

Rare in California—In mid-January there was some extra-curricular weather in California when two tornadoes, first recorded in the state, swept through Santa Clara County. The 78-mi. wind also lifted roofs and shifted houses, causing damage to the area estimated at about $1,500,000. Funneling through the industrial area of Sunnyvale, it pulled out a wall at the Westinghouse plant there, twisted supports of a craneway and knocked out skylights and roof sections. The storm left a narrow trail of some 200 roofless and otherwise battered houses in Sunnyvale and San Jose. For a little while Sunnyvale was a misnomer.

Hourly weather forecasts—A plan by which the New Jersey highway department hopes to speed up the sanding of icy roadways has been announced by Commissioner R. J. Abbott. The N. Y. Weather Bureau will make hourly revisions in weather forecasts available to the department so that freezing conditions can be anticipated and time saved in getting sanding operations under way.

Off again, on again—Less than a year ago Wakefield, Mass., voted to establish a public works department. Now some of the town officials and voters are figuring how to get rid of it. Reason is the selectmen miss their old job of running the highway, sewer, water and other departments. Town counsel says they will have to get the legislature to pass an act before the department can be abolished.

The Cover

A new titanium smelter at Sorel, Que., (ENR Jan. 4, p. 35) will be the biggest customer for power from this new hydro plant at Trenche, on the St. Maurice River, 130 miles above Three Rivers.

Owned by the Shawinigan Water and Power Co., this dam will be one of six on the St. Maurice, that provide a total of 1,600,000 horsepower for Canadian industry.

The smelter will convert ilmenite into pig iron and titanium slag to feed expanding U. S. and Canadian steel industries.

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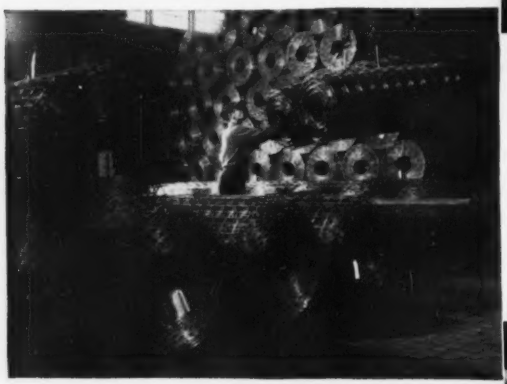

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THE CONSTRUCTION WEEK

CHAIN REACTION—Completion of the western segment of the Pennsylvania Turnpike this year poses a highway problem for Ohio—to provide channels for the thousands of cars and trucks expected to pour off the end of the turnpike. Discussions in other states, too, have shown recognition of further highway improvements needed as more and more thruways are built.

SAVANNAH RIVER WAGE SCALES PROTESTED—CIO leaders in the two Carolinas telegraphed President Truman protesting against wage scales announced for construction of the AEC H-bomb plant in South Carolina (ENR Feb. 15, p. 23). Wages set provide hourly wages ranging from 90 cents an hour for unskilled workers to $2.60 an hour for plumbers and steamfitters. Scales in general follow recommendations made by the Carolinas Branch of AGC.

PRIORITY FOR AIR DEFENSE—Canada allocated $250 million for defense construction during the next 12 to 15 months. It is expected that much of the money will go into airfields at $20 million each and radar stations at $3 million to $6 million each.

HOME OWNERS EXCEED RENTERS—The Bureau of the Census reports that in 1950—for the first time since the record was started in 1890—owner-occupied dwellings outnumbered renter-occupied units. Owners numbered 23.4 million; renters 19.1 million.

DRAFTSMEN PREFER GREENER PASTURES—Pittsburgh Public Works Director, James S. Devlin, reports that municipalities cannot compete with private industry in salaries for engineering personnel. He cited the case of draftsmen hired by the city as college graduates, leaving for industrial positions after one year of training. They earned $208 a month with the city. Similar jobs in industry pay from $350 to $375 a month.

HOUSING WORKERS VOTE FOR RIGHTS—A housing project operated by a large insurance company has sufficient impact on interstate commerce to warrant application of the Taft-Hartley Labor Law. The NLRB so decided, in directing a bargaining rights election among maintenance employees, gardeners and janitors of Parklabrea Resident Community in Los Angeles. The project is owned and operated by Metropolitan Life Insurance Co.

CONSERVATION DRIVE—NPA is working with industry advisory committees on orders to save critical metals. There is a big push at present to do builders' hardware what APB did under L236—reduce the number of hardware items from 27,000 to 3,500. In a period of scarcity, manufacturers welcome such standardization measures. The cement makers will get one, two, cutting the present several score types to less than a dozen, as was done in War II.

INTEREST-FREE PLANNING FUNDS—Raymond M. Foley, HHFA Administrator, approved an interest-free advance of $17,120 to North Augusta, S. C., to aid in planning a greater water supply for the town, in anticipation of the influx of workers for the new Savannah River AEC project. The town of Barnwell will receive $11,760 to plan a new school. The advances are to be returned when construction is started.

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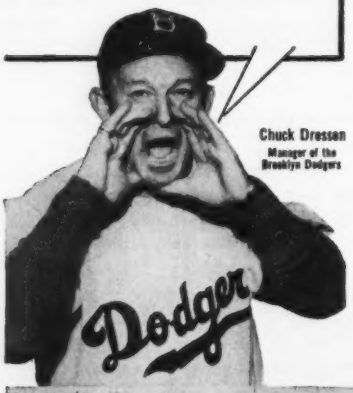

Chuck Dressen
Manager of the Brooklyn Dodgers

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CONSTRUCTION TRENDS

INDUSTRIAL EXPANSION PROMOTES POST-EMERGENCY CONSTRUCTION

Industrial expansion, prodded by U. S. mobilization, is building new markets for future U. S. construction—just as it did in World War II. All regions are benefiting, but prospects are that the south and southwest will gain most.

In the last war, U. S. industrial expansion was particularly heavy in the south and west. Wartime growth in industry gave those regions a big boost in income and helped create conditions that led to the postwar boom in all types of construction.

The same thing is happening this time. After Korea, contracts for new industrial construction jumped more in the south than in any other region. There's no reason why the end result shouldn't be the same—more housing, commercial building and public construction.

But this time some of the older regions are holding their own much better. The middle west, particularly stands to gain from the rearmament boom.

SOUTH AND WEST GAINED LAST TIME—World War II brought new industries to the south, southwest and far west. After the war, many of the plants went on operating, making products for the big postwar civilian market.

Larger industries meant a permanent addition to needs for construction in those areas. Many new industrial workers moved from farms into cities, helped swell demand for new houses, school, commercial buildings, streets and roads.

And industry, by paying higher wages and salaries, helped pay for the new private construction. Southern per capita income jumped 192% between 1939 and 1949. In the far west, total personal income increased 260% in the same period.

One result of these developments was a huge postwar increase in most types of urban construction. In 1946-49, the value of commercial building averaged 1440% over the 1935-39 average in the south and far west, 1698% higher in the region west of the Mississippi. The average annual value of all new private construction went up between 660% and 793% in the three regions.

Now the U. S. is off on another wave of industrial expansion—which may have the same effect on other types of construction in the long run.

In late 1950, mobilization caused a big increase in plans for industrial expansion. The value of new contracts for industrial construction, as measured by ENR, was almost twice as large in the second half of the year as in the first half.

SOUTH LEADS AGAIN—The south had the biggest jump—second-half contracts were well over three times first half figure. The south got about 15% of total U. S. first-half contracts, over 30% in the second half.

Texas is gaining too—just as it did last time. Industrial contracts jumped about 50% in the second half of 1950. When all the returns are in from the huge aluminum expansion—most of which will be in Texas—the state is expected to show a large and permanent industrial growth. The far west, too, has had a large increase in industrial building contracts.

NORTH GAINS TOO—In World War II, while the south and west gained industry at a spectacular rate, the older industrial regions didn't do so well. This time it looks as if the older areas will hold their own.

Many large defense contracts are going to the middle west. Much of the huge U. S. expansion in steel will go into East Chicago, Gary, Cleveland and some new plants in Michigan. Detroit, with big defense contracts—like Chrysler's for jet engines—is building again.

Many of these facilities—especially the new steel capacity—are expected to remain in operation after the emergency.

The Middle Atlantic area is getting many new plants. Steel mills are being built in eastern Pennsylvania and planned for New Jersey, where ore from new deposits in Venezuela and Labrador can reach them by water. Defense plants—for example, the Chrysler tank factory in Delaware—are going up near the steel mills.

New England is looking forward to gains during the mobilization period. The long-time dream of a New England steel mill is making strong progress. Other plants are expected to locate near the new steel mill, thus giving a substantial boost to the industrial development of the region.

Mobilization has caused new interest in the St. Lawrence Seaway project. It's urged as an easy means of transportation for Labrador iron ore. If the project goes through it means more electric power and easier transportation for northern New England—and hence more industry in the future.

Having made progress on the steel mill project, New Englanders are now thinking of an aluminum reduction and an aluminum fabricating works, one for Vermont, the other for New Hampshire. These are not expected to develop for some time—but the St. Lawrence Seaway, if it's built, would provide needed power to bring them much closer to realization.

THE OUTLOOK—The south and west are again leading the mobilization spurt in industrial building. But they are getting more competition from some of the older regions. Prospect is that, in the long run, all regions will gain industry, increase incomes and build demand for post-mobilization private construction.

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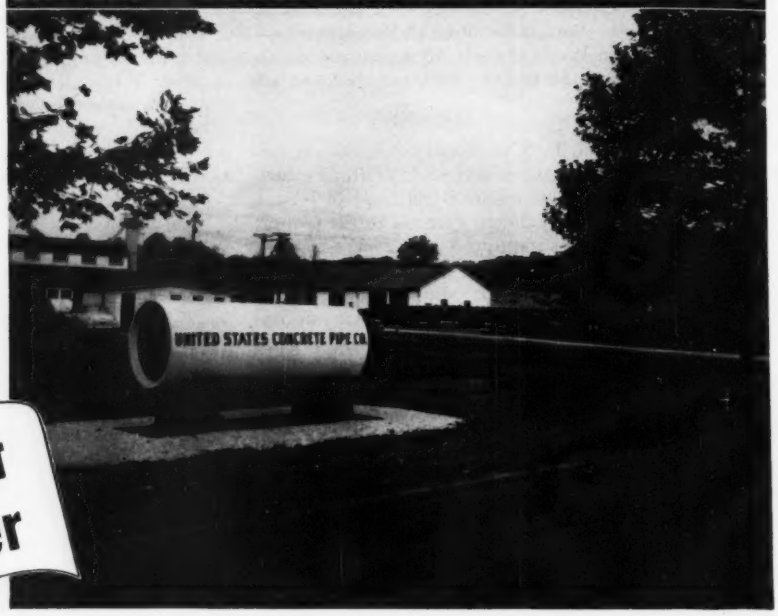

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An intriguing proposal

STEEL WIRES or strands with an ultimate strength of about 225,000 psi, or slightly more, have been successfully used to prestress concrete. They apply a compression that prevents the concrete from cracking under design loads. Working stresses in the steel generally are somewhat larger than 100,000 psi. To the American concrete designer, accustomed to work his steel at stresses no greater than 20,000 psi, this is a radical concept. What then is he to think of Professor Rubinsky's proposal (p 45) to use glass-fiber strands or cords having an ultimate tensile strength of over 1,000,000 psi?

Most engineers know that in ordinary reinforced concrete, such high stresses cannot be permitted, because of the large cracks that would be formed. But for prestressed concrete, high working stresses are advantageous. Hence, Professor Rubinsky's claim that glass-fiber cords possess qualities far superior to those of cold-drawn, high-tensile strength steel is worthy of serious consideration.

There are, however, several problems to be solved before the professor's proposal reaches a practical stage. Mainly, these are: (1) How to prevent the glass fibers from losing strength due to moisture; and (2) How to make a cord or strand so that the stress distribution across any section would always be uniform. Unless such uniformity can be obtained, a cord cannot be assumed to have the combined strength of the individual fibers of which it is formed.

Although this proposal still is in the realm of theory, its possibilities appear intriguing enough to justify experiments to determine whether the idea has any practical applications.

Rainmakers' troubles

DAMAGE SUITS totaling to nearly $1,300,000 have been filed against New York City as a result of the city's use of rainmakers in the Catskill Mountains area last year in an effort to supplement the city's dwindling water supply. All the suits are based on damage claimed to have been done by the heavy rainstorm of Nov. 25-26. City authorities are said to have admitted that their rainmaker, Wallace E. Howell, did some "ground seeding" at that time.

The possibility that rainmaking might result in damage suits against the agency sponsoring the rainmaking work has been recognized ever since the start of such experiments. Any artificial change in the normal rate or time of precipitation that might benefit one person or agency could, conceivably, be shown to have injured some other person or some business activity.

This possibility of becoming involved in damage suits already has kept some communities in semi-arid regions from acting on quite favorable showings by rainmakers.

Concerning the suits now brought against New York City, it would appear to be in the city's favor that the claimants picked the great storm of Nov. 25-26 on which to base their damage claims because that storm swept over a wide area. Had the rainfall on which the claims were based occurred only in the Catskill region, where the ground-seeding operation took place, the courts might have concluded that the rainfall was produced artificially. But it does not appear probable that any court would find that the near hurricane of Nov. 25-26, which swept over the whole North-Atlantic region was caused by a small cloud of silver iodide smoke released in a remote part of the Catskill region. The Weather Bureau office at New York gave quite a different explanation.

Presumably the Nov. 25-26 storm was picked as the basis for all these suits because it did much damage. Yet selection of that storm in preference to a small one that could have been started by the rainmaking operation appears to have ruined the claimants' chances of collecting any damages from the city. The only people who can be expected to collect are the lawyers —unless, perchance, they took these suits on a contingent-fee basis.

Municipal regulation and utilities

A PROJECT of considerable merit has been launched by the East Bay (Calif.) chapter of the American Public Works Association. Here members representing a number of contiguous municipal public works agencies along with representatives from gas, electric and telephone companies have formed a committee to unify regulations and methods of handling permits relating to the installation of underground utilities. The present situation—at least from the viewpoint of the utility companies—is said to be almost chaotic in the variety of municipal requirements even in adjacent communities. Carl Froerer, city manager of Alameda, Calif. and western vice president of the APWA, some months ago pointed up the opportunity, the need and the challenge for doing a job on regional unification in this field of municipal utility regulation. He properly challenged the newest local chapter of the association to do something about it. Mr. Froerer's challenge might well be extended to chapters of APWA in every section of the United States. There is little sense, too much whimsy and quite a lot of unnecessary expense attached to the many variations required by municipalities in their regulation of utility installations. The APWA can extend its usefulness by urging all of its regional groups to attack the problem of unification of practice and methods.

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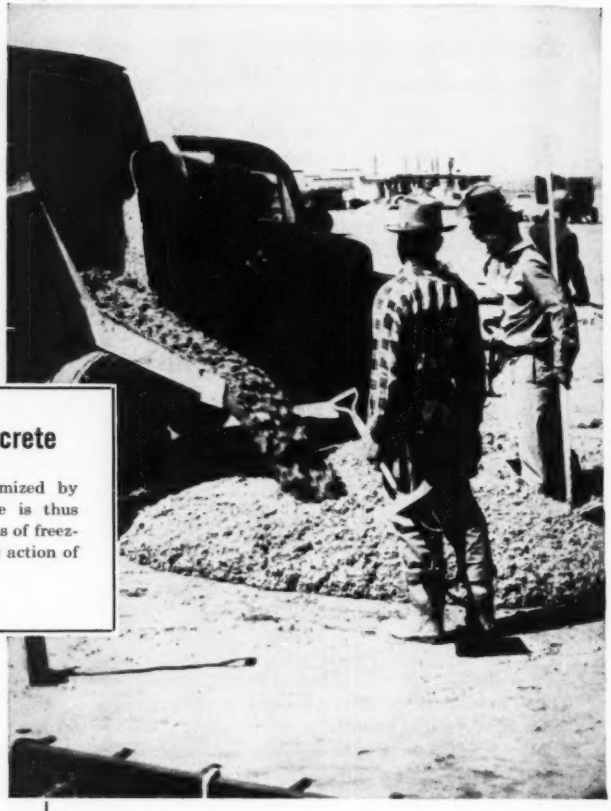

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ENGINEERING NEWS-RECORD

MARCH 1, 1951 VOL. 146 NO. 9

ACI building code to increase bond stress for deformed bars

San Francisco convention refers code change to membership for final vote—Earthquake papers highlight technical sessions—New officers elected.

L. L. Wise
Associate Editor

Use of the new style deformed bars in the design of reinforced concrete buildings is almost official—at least as far as the American Concrete Institute is concerned.

A revision of the ACI building code to allow for improved properties of these bars was approved by the members attending the 47th annual convention in San Francisco last week.

Confirmation of the revisions by mail ballot of the entire ACI membership is all that's necessary to make the code changes official.

As usual, papers on a wide diversity of subjects dealing with concrete were presented at the meeting held Feb. 20-22. One of the highlighted sessions dealt with earthquake design.

This is the first ACI convention ever held on the Pacific Coast.

Although the papers presented were of interest, the most important activity of the convention seemed to be the building code revision—even though consideration of the code by the convention is a routine step.

The so-called new style deformed reinforcing bars have been under development for some time. They have been the subject of research at the National Bureau of Standards for the last five years that has already resulted in a standard for deformation on bars adopted by the American Society for Testing Materials (ASTM 305-49). It also has resulted in the rolling of these bars by steel mills almost to the exclusion of other type deformed bars.

• **Hooks not needed**—As would be expected, the code requirements provide more liberal bond stresses for the new style deformed bars. All other bars, including the old style deformed bars, are now classed as plain bars. Except for top bars and bars in two-way footings, allowable bond stress for deformed bars is 10% of the design strength of the concrete. This compares with 5% previously used.

Top bars are defined as those so placed that more than 12 in. of concrete is cast below the bar. There was some question at the meeting regarding exact definition of two-way footings and this may be cleared up later. Allowable bond stress for top bars is 7% of the design concrete strength and in two-way footings is 8%.

The revisions require that all plain bars be hooked for anchorage, whereas the new style deformed bars are allowed to develop anchorage by bond alone. Allowable bond stress for plain bars is 4½% of the concrete strength except for top bars and bars in two-way footings.

The convention also adopted for later confirmation by mail ballot revisions of the Manual of Standard Practice for Detailing Reinforced Concrete Structures brought about by the changes in the building code due to the new bond values, and adoption of a number system for specifying bar sizes.

The group also acted on specifications for concrete pavements and bases and a proposed recommended practice for application of shotcrete.

A by-laws change calling for increased dues was also referred to the membership for confirmation. The change will increase individual dues from $12.50 a year to $15, contributing memberships from $50 to $100 a year, and dues for corporation representatives from $25 to $50 a year.

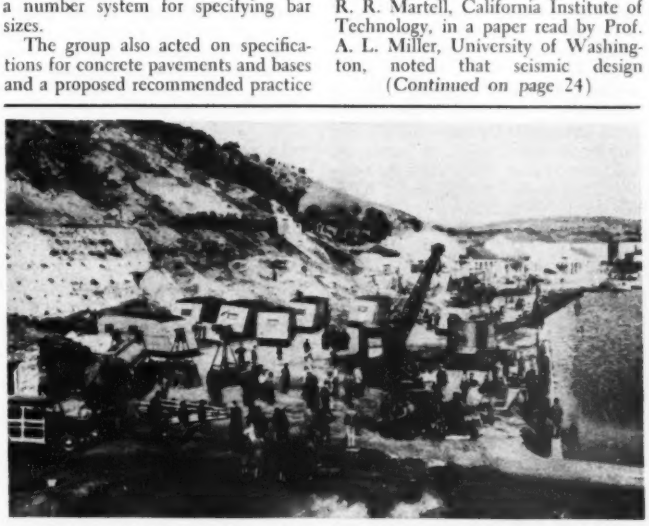
• **New officers**—Harry T. Thomson, manager, Redi-Mix Concrete Division, Material Service Corp., Chicago, was elected ACI president, succeeding Frank H. Jackson, principal engineer of tests, Bureau of Public Roads, Washington, D. C.

Henry L. Kennedy, manager of the Cement Division, Dewey and Almy Chemical Co., Cambridge, Mass., was elected vice-president.

Elected to 3-year terms on the Board of Directors were Frank Kerekes, assistant dean of Engineering, Iowa State College, Ames, Ia.; G. L. Lindsay, director of tests and research, Universal Atlas Cement Co., New York; I. E. Morris, consulting engineer, Atlanta, Ga.; and Walter H. Price, head, Materials Laboratory, Bureau of Reclamation, Denver, Colo.

• **Technical sessions**—Lack of detailed knowledge about the effects of earthquake on structures was the substance of two papers on this subject. Prof. R. R. Martell, California Institute of Technology, in a paper read by Prof. A. L. Miller, University of Washington, noted that seismic design

(Continued on page 24)



GREEKS GAVE THE WORD—Construction equipment arrived on the island of Euboea, near Athens, and work was begun on a 68,000-kw, steam generator electric Plant—an ECA project. Workmen are preparing a warehouse site. (Wide World photo)

ASCE meet in Houston spotlights engineering problems of southwest

International aspects of multipurpose Falcon Dam on Rio Grande presented—Carlton S. Proctor presidential nominee.

Civil engineers from several parts of this country and Mexico learned much about Texas' engineering problems and accomplishments last week. Occasion was the winter meeting of the American Society of Civil Engineers, in Houston.

Many of the technical sessions were devoted to civil engineering elsewhere, but, befitting the location of the three-day meeting, the accent was on Texas. Attendance exceeded 900, with many being lured to the meeting, no doubt, by the prospects of sunny weather. This they got. Temperatures reached well into the 70's.

• **1952 presidential nominee**—Carlton S. Proctor, consulting engineer, New York City, was named by the nominating committee as official nominee for the society's 1952 president. In other action at its meeting preceeding the convention the Board of Direction endorsed the current project of Engineering Manpower Committee of the Engineers' Joint Council for increasing the number of engineering graduates and integrating them better in both the military and industry.

Results of studies made during the past two years by an exploratory conference of 15 national engineering societies on increasing unity between the engineering professions are to be made available to local chapters of ASCE for their consideration and suggestions, said W. N. Carey, executive secretary.

• **Texas highways**—Although highway construction in Texas is lagging behind transportation requirements—due largely to the upsurge of traffic developments since the end of the war—the state highway department hopes to regain the ground it has lost in the past five years. This can be done, declared D. C. Greer, state highway engineer, but only by maintaining public support for providing sufficient funds.

Looking at the highway problem nationally, Greer pointed out the glaring fact that 80% of our 233,000-mile primary highway system outside of municipalities need improvements that would cost $13.5-billion. An additional $7.5-billion worth of construction is needed within the cities.

Since such a program is utterly impossible at this time, it would be far better, said Greer, to concentrate on the 40,000-mile interstate highway system as the nucleus of the major transport system; then skip over the remainder of the primary system and concentrate on secondary, or farm-to-market roads.

• **Texas expressways**—Texas has gained national recognition for expressway construction in its five major cities. The greatest misconception in expressway development, according to W. J. Van London, engineer-manager, Houston Urban Expressways, is that expressways should be used only by passenger cars.

Although the proposed 6-mile expressway in the central interchange area in downtown Houston will cost $30,000,000, savings accruing to its users would equal its cost in 10 years, and would be greater than on the Gulf Freeway. The proposed expressway, to be partially multiple-level and depressed, will cross 62 railroad tracks, 26 streets and 9 streams in its 6-mile length through extensive commercial and industrial property. When and where the money would come from for this project, he did not know.

Considerable construction economy resulted from extensive soils engineering on the 6-mile Gulf Freeway, which has been completed at an average cost of $1,800,000 per mile. Design loads for structure footings were increased from 2.0 to 3.5 tons per sq ft, based on analyses of soils taken from 30-in. test borings, reported F. A. Harris, senior design engineer on the project.

On one large underpass alone exploratory tests costing $1,800 saved $90,000 by proving the feasibility of the enlarged-base type cast-in-place concrete piers.

• **Expressway bridges**—Architectural treatment of certain expressway bridges in Texas, inaugurated chiefly for aesthetic reasons, have proved more economical than conventional design. One example, said R. B. Alexander, state highway bridge engineer, is the rigid-frame bridge for skews less than 30 deg. Another is use of round col-

(Continued on page 25)

For earthquakes: dynamic assumptions

(Continued from page 23)

procedures must be based on a reconciliation of theory and observed damage.

In a subsequent discussion, Prof. Miller, referring to the Seattle earthquake of 1949, said that the only way to find out about an earthquake is to have one. In further amplification of Prof. Martell's paper which emphasized unknowns in earthquake design, Prof. Miller reviewed briefly the recent formation of the Earthquake Engineering Research Institute.

Mr. Whitney added his thoughts to what has been considered in recent years a problem peculiar to far western areas. Whitney read a paper prepared by Boyd G. Anderson, Mario Salxadori, and himself telling of an earthquake analysis method based on dynamic, not static assumptions.

This design procedure, still in the development stage, assumes harmonic oscillation and is an extension of S. P. Timoshenko's step-by-step procedure. John J. Gould, San Francisco structural engineer, commented that the earthquake design requirements of the San Francisco Building Code appear conservative.

• **Precast concrete bridges**—Stewart Mitchell, principal bridge engineer, California Division of Highways, pointed out that simple prestressed bridges should have best application for spans from 60 to 80 ft long. By adding hollow sections economies can be realized in prestressed bridges up to 120-ft span. Such structures could be quite valuable in layout of freeway interchanges where vertical clearances are at a premium.

• **Alkali-aggregate expansion inhibitors**—Research that may prove quite fruitful directed toward the finding of compounds that when added to cement will reduce expansion due to alkali-aggregate reaction was described by W. J. McCoy, Lehigh Portland Cement Co., Allentown, Pa., in a paper by him and A. G. Caldwell.

Hundreds of compounds were tested in pyrex-glass bar-tests. Most promising seem to be the addition of a small percentage (about 1%) of lithium salts either in the form of carbonates, chlorides, fluorides, or silicates. Tests on ordinary concrete made by adding such salts to the cement have shown no adverse effect on the other properties of concrete.

• **Concrete pavement joints**—A research on joint troubles in concrete pavement was described by F. N. Hveem, construction engineer, California Division of Highways. This study involved taking core samples of pavements near joints, studying the underlying subgrade, and also measuring the smoothness of concrete pavements by a newly-developed instrument known as the profilograph.

Preliminary conclusions of this research are that joint troubles will develop where expansion joints are constructed, where there is high water content under the slab, and where there is a high number of heavy axle loads applied.

ASCE focuses on Texas problems

(Continued from page 24)

umns for piers, chosen because of their appearance as well as better structural and hydraulic efficiency, which have proved cheaper to build than other types.

Texas freeway structures, in general, carry no pedestrians, since they would interfere with the flow of traffic. Roadway curbs are kept low, and are carried out 3-ft or 4-ft to a higher curb carrying the handrail. This is done, said Mr. Alexander, to encourage traffic to use the full width of roadway.

• **Falcon Dam**—An international flavor was introduced into the meeting by one session devoted to developments of Falcon Dam on the Rio Grande River about 75 miles downstream from Laredo, Tex. Construction of this project, said David J. Herrera, commissioner for Mexico, for the International Boundary and Water Commission—under whose jurisdiction it is being built—marks another stage in the application of the U. S.-Mexico International Water Treaty of 1944.

Storage areas back of this dam that are allocated to power, flood-control and silt accumulation are to be used in common by the two countries, but its water conservation capacity of 2,100,000 acre-feet is to be divided according to a formula set out in the treaty. Each country will have its own outlet works and its own power plant, but Plants will be interconnected, producting international power to be divided equally between the two countries, said Commissioner Herrera.

Construction programs of the Falcon Dam project call for its completion by Oct. 3, 1953—just 35 days ahead of the treaty completion date, reported C. M. Ainsworth, principal engineer, U. S. Section of the commission. It's power plants will generate 200 million kwh of prime energy annually and 50 million of secondary power.

• **International sanitation**—The commission also is engaged in international sanitation projects, said Commissioner Lawson. One such project recently completed in Douglas, Ariz., serves that city and Agua Prieta, Sonora, Mexico. Another plant under construction will serve Nogales, Ariz. and Nogales, Sonora.

• **Atomic bomb precautions**—Safeguards against atomic explosions came in for their share of discussion. Contamination of water in the event of such an attack is of high concern although, if the attack is not too severe, natural factors such as dilution by flow, natural decay and absorption may render water fit for drinking. This was the opinion of Commander J. S. Marsh, CEC, U. S. Navy, who described decontamination agents to the group.

One method of decontamination makes use of "complexing agents". Research has disclosed tri-sodium-phosphate or commercial boiler compounds of similar structure are fairly satisfactory and cheaper than many compounds used at Bikini. They form soluble complexions with the radioactive elements, have a greater affinity for the radioactive element than the surface, thereby giving a means of removal by flocculation, sedimentation and filtration.

Future road improvements to be studied in Canada

A study of long term road improvements in Canada, driving hazards and city parking problems, has been undertaken by the Canadian Good Roads Association, with Robert M. Hardy, dean of engineering at the University of Alberta, in charge.

A study of the latest road improvements is also planned for the U. S., Great Britain and other countries. The association's study of road layout and design improvement aims to promote safe and efficient traffic flow, better examination of materials and methods of constructing safer and more durable roads. Parking problems and community planning, road safety, weather studies in connection with winter driving, and encouragement of driver training in secondary schools are other topics of study.

NPA prefers persuasion in control enforcement

With persuasion—not punishment—as its prime purpose, NPA is organizing compliance on controls on a regional basis, delegating authority to a compliance commissioner in each regional office of the Commerce Dept. throughout the country.

The regional compliance man will warn a violator by a series of letters, assuming innocent infringement. If the violator does not mend his ways, a final letter will tell him that the matter will be referred to the Justice Dept. unless the violator immediately complies with the rules. A copy of this letter goes to the NPA regional attorney.

If the violator proves obstinate, the attorney sends the case to the NPA general counsel in Washington. Thence it goes to the Attorney General, to the Anti-Trust Division and to the U. S. attorney in the region. The government attorney starts suit for injunction under the Sherman Anti-Trust Act.

The Justice Dept. is eager to get into the action at this point. Under the Defense Production Act, NPA can punish a violator by administrative sanctions, without consulting Justice or anybody else. Working arrangements have been agreed upon by Attorney General McGrath and NPA Administrator Manly Fleischmann.

Injunctions are preferred to criminal actions. The law and all NPA orders set up fine-and-imprisonment penalties that could be invoked, but only a flagrant violator will get the criminal works.

As a spur to the Justice Dept., NPA holds in reserve a suspension order that it can issue against the violator. NPA will be careful about judging cases for suspension; the purpose is to save materials and not to obstruct important production operations.

Constructors elect Pritchard president

The National Constructors Association elected J. F. Pritchard, head of J. F. Pritchard & Co., Kansas City, Mo., as president.

New vice president is J. J. O'Donnell, manager of personnel and labor relations for the Lummus Co., New York. C. B. Bronson continues as secretary-treasurer of the constructors' organization.

WAR-WEARY BRIDGE—Heavy traffic on a light-duty structure deep in Korea helped bring on this partial collapse under the weight of an M-4 tank. First Cavalry Division engineers rig temporary shoring until tank retriever can be brought up. (Wide World photo)

Let pollutors help finance research with permit fees, Purdue meeting told

Waste conference hears of serious stream pollution by insecticides—Paper industries' pollution control group meets in New York

Permits required for continued pollution of our streams should impose a financial burden on the holders. This would not only lead the backward to correct bad practices, but it would help states finance research in treatment of industrial wastes.

This was the proposal of J. H. Murdock, Jr., vice-president and counsel, American Water Works Service Co., speaking before Purdue University's Sixth Annual Industrial Waste Conference at Lafayette, Ind., last week. No industry or community has any right to pollute the waters said Murdock; we cannot afford to dissipate our limited water resources by using streams as mere carriers of filth.

C. M. Henderson, Water Pollution Control Division of the Federal Security Agency, called proper use of streams more the concern of legislatures than of courts and recommended stronger centralized power over pollution within states, cooperation among states.

The first known instance of extensive stream pollution by agricultural insecticides was reported by L. F. Warrick of the Public Health Service. He said that last August fish kills occurred in 15 Alabama streams of the Tennessee Valley, resulting from insecticides for controls of cotton pests. Warrick asked a re-evaluation of present-day use of insecticides which are apt to wash into streams.

• **Paper group meets**—And in New York City a single industry aired its waste problems as the National Council for Stream Improvement, Inc., of the pulp and paper industries held its annual meeting. A research review, moderated by the council's technical director, Harry W. Gehm, featured seven brief papers by consultants and employes of the group, each critically discussed by some invited representatives from sources outside of the industry.

Calling for maximum utilization of streams without abuse, the council's consultant, C. J. Velz, chairman, department of public health statistics, University of Michigan, stressed importance of statistically analyzing expected drought severities in preventing or correcting severe pollution conditions. Mill effluent must be related properly to stream flow if pollution load requirements are to be met, he said. Discussing Velz's paper, D. B. Lee, director of Florida's division of sanitary engineering, State Board of Health, said dissolved oxygen alone should not be the full criterion for measuring pollution. Percent saturation of DO for Florida, with its streams high in chlorides and temperatures, does not have the same meaning as for other locales.

One important statement of the session went uncontested: Stating that "the heat is definitely on" regarding pollution abatement, Dean of Engineering G. W. Gleason, Oregon State College, asserted that there is as yet no simple and economical method for treating sulfite liquors, the offensive wastes of sulfite mills.

Seattle sewerage may set pattern for such work

A $1,896,700 project which may determine the type of sewage disposal program at Seattle, Wash., for years to come have been approved by the Municipal Board of Public Works, following earlier approval of the plans by the State Pollution Control Commission.

The city of Seattle and the state have been at odds over the type of sewage treatment to be used there. Seattle has held for dilution of sewage and disposal into the swift, deep currents of Puget Sound. The state has, until now, held for complete treatment.

William F. Carey dies; sanitation leader

William F. Carey, 72, internationally known engineer and industrialist, who was sanitation commissioner of New York City from 1936 to 1945, died at Indio, Calif., Feb. 23. He was president of the New York engineering firm of Carey, Baxter and Kennedy, Inc.

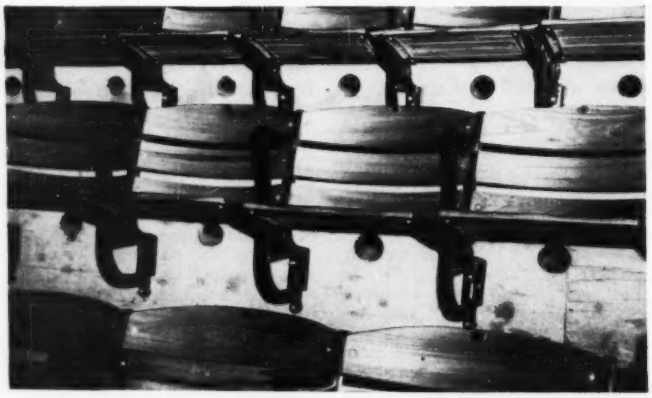
Mr. Carey started his career in railroad construction camps in Colorado in the eighties. He later worked on Panama Canal construction and then returned to New York and started his own contracting business. He designed and built many machines for construction and mining projects. He built the new Madison Square Garden in N. Y. City. In 1936 he undertook the reorganization of the Sanitation Department and successfully accomplished it.

In the first world war he built a logging railroad for the government. In the second war he was a special advisor on construction of Army, Marine and Aviation contonments.

U. S. considers road plans for Newfoundland bases

A group of paved roads to connect four United States bases on the island province of Newfoundland are reported under consideration by the United States government. The military roads would cost about $100,000,000.

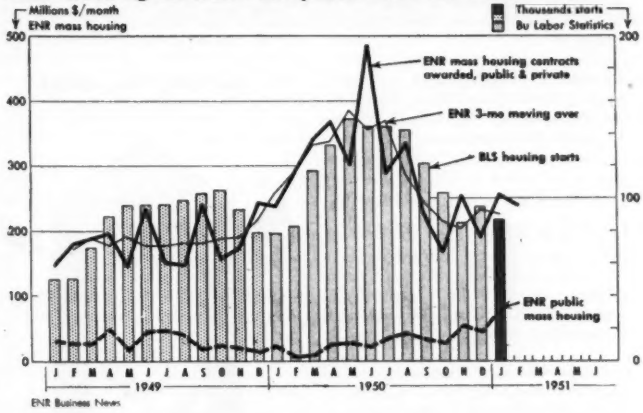
The roads would presumably run from the Argentia naval base to the Gander airport, and connect Forts Pepperell and McAndrew, and the Ernest Harmon airfield with Gander.



PIGEONHOLES—Forced-air outlets under each seat in the balcony section are a feature of the new Bexar County Coliseum, San Antonio, Texas. Space under the balcony tiers is utilized as a large air chamber, from which air is forced through these 3-in. openings into the large ampitheater. During cold weather, the air is heated before being circulated by fans. In the summer, the fans help to ventilate the building. Heating-ventilating system was designed and built by the Dravo Corp., Pittsburgh, Pa.

CONSTRUCTION BUSINESS

Mass housing contracts compared with estimated starts



Housing dies hard, public projects gain

Controls or no controls, housing construction continues at record rates for this season. Mass housing contracts were the highest ever reported by ENGINEERING NEWS-RECORD for January: $254 million.

Awards reported in February dropped back a little, to $241 million, but that figure is 33% higher than contracts reported in February 1949.

Housing starts in January—at 87,000—were the most ever reported for that month by the Bureau of Labor Statistics. And building permits for January broke all records with $446.9 million for 215 cities as reported by Dun & Bradstreet, Inc.

A 74% rise over Jan., 1949 is the ENR mass housing record for Jan. 1951. BLS starts also show a 74% rise over 1949 and D&B building permits chalk up a 100% gain over Jan. 1949.

Public housing accounted for 21% of the ENR mass contracts reported in Jan., 1949. It was only 9% in Jan., 1950, but it was up to 32% of the Jan. 1951 awards. In February public housing was 21% of the contract volume reported.

Washington officials comment: "Home building is holding higher than was expected last year when credit was tightened. Unless there's an easing in a few months, credit will be tightened more, by upping cash-down requirements."

Plywood stocks lower

Interior softwood plywood stocks were down to 35,763 m sq ft, ⅜" equivalent at the end of December. This is 18.5% lower than in November and 10.5% less than December stocks a year ago. Exterior plywood stocks are down to 11,622 m sq ft as the year closes. This is 16% less than stocks of a month ago, but it is 25% more than exterior plywood stocks a year ago.

Softwood plywood producers in December turned out 232,577 m sq ft, 4% less than their November production. But this is 20% more than they produced in December 1949.

Producers shipped 242,722 m sq ft, practically the same as their November shipments, but 22% more than they shipped in December 1949.

Interior plywood production was down 7.5% in December from the month before but exterior plywood output increased 4% to 63,656 in sq ft. Shipments of interior plywood fell off 2% in December while exterior plywood shipments gained 6.5%.

Cement concrete pavement shows big increase

Portland cement concrete pavement contracts increased 65% in January over 1950 awards for the same month. The yardage involved, 5,650,415, is 51% higher than December awards. And December awards were 23% above the previous year as reported by the Portland Cement Assn.

For the full twelve months, 58,528,311 sq yds of concrete pavement was put under contract. This is 27% more than in the previous year. By classes of pavement, roads got 28,330,381 sq yd, an increase of 18%; streets and alleys got 27,023,159 sq yd, an increase of 46% and airports got 3,174,771 sq yd, a 16% increase.

The January, 1951 awards are for streets and alleys, 2,251,662 sq yd, up 98% from a year ago; roads awards are 3,198,842 sq yd, a rise of 63% over Jan., 1950; and airport pavement awards total 199,911 sq yd.

Construction adds to new business birth rate

A rise of 11% brought 400,000 new businesses into being in 1950. This is a net gain of 50,000 businesses over those discontinued. The "death" rate declined 10% from 1949 when 30,000 more businesses died than were formed.

Construction, durable goods manufacturing and transportation contributed most to this 1950 increase according to the Department of Commerce.

Wholesale prices creep up

Building materials wholesale prices moved up slightly to 226.7 for the week of Feb. 13 from 226.5 the previous week. These indexes are based on 1926 = 100 and are computed by the Bureau of Labor Statistics.

Metals and metal products prices dropped back to 188.7 this week from their 188.9 value last week.

All commodities moved up only slightly to 183.3 from 183.2 a week ago.

Lumber stocks gain

For the first time in several weeks lumber production gained over both shipments and new orders. For the week ending Feb. 10, shipments were 9.4% below production and new orders were 14.5% below, as reported to National Lumber Mfrs. Assn.

Compared with the same week last year production was 21.5% higher, shipments 8.2% lower and new orders 31.4% lower.

For the year to date shipments have averaged 3.6% above production and new orders have run 16.5% above.

Asphalt products boom

Asphalt roofing producers shipped 64,016,441 sales squares in 1950. This is 22% more than 1949 shipments. Asphalt board products turned in the biggest gain, 50% to 48,375,883 sq ft. Strip shingles were next with a 33% increase to 31,388,311 sales sq. mineral-surfaced roll roofing increased 12% to 14,021,010 sales sq.

BIDS AND BIDDERS

(Major project news received after Construction Reports, page 58 went to press.)

Veterans Hospital—Cauldwell-Wingate Co., New York, N. Y., was low bidder at $19,177,000 for the construction of U. S. Veterans Hospital, in New York City, when bids were opened Feb. 20, by the U. S. Engineers, New York, N. Y. Alfred Hopkins Associates, New York, are architects. Guy B. Panero Engineers, New York, is mechanical engineer and Fred N. Severud, New York is structural engineer.

Steel Plant—Bethlehem Steel Co., Lackawanna, N. Y. plans a $100-million steel plant, including blast furnace, four open hearth furnaces, seventy-six coke ovens and facilities for finishing steel.

Aluminum Plant—Albert Kahn Associated Engineers & Architects, Inc., Detroit, Mich., will make plans for altering present buildings at Chicago, Ill., into assembly plant for the Ford Motor Co., Dearborn, Mich. Estimated cost is $60,000,000.

Road—State of Maine, Augusta, plans expressway through Portland between Maine Turnpike in West Scarborough and Falmouth, including new bridge over Fore River. $25,000,000. Work is to start in 1951.

Aluminum Plant—American Bridge Co., Pittsburgh, Pa. has been awarded contract to construct $12,000,000 aluminum plants for Aluminum Company of America, Port Lavaca, at Port Lavaca and Port Neches, Tex.

Market—Massachusetts State Market Authority, Boston, Mass., plans to construct a $15,000,000 market in South Boston, for which site has not been selected. Praeger Maguire Associates, and Fay Spofford & Thorndike, Boston, are consulting engineers.

Power Plant—Combustion Engineering-Superheater, Inc., New York, N. Y., has been awarded contract for four boilers to be as high as fifteen story buildings and the largest of their type in the world. Electric Energy, Inc., St. Louis, Mo., made award for power plant at Paducah, Ky., which will supply power for Atomic Energy Commission project. Total cost of plant is $85,000,000. Ebasco Services, Inc., New York, N. Y. will design and construct entire project.

Jet Plane Base—Bureau of Yards & Docks, Arlington, Va. has awarded an engineer-architect contract for jet plane base near Fort Barancas, (Pensacola) Fla. to Palmer & Baker, Inc., Mobile, Ala., consulting engineers. Estimated overall cost of project, $23,000,000 including two 8,000-ft parallel runways.

Electric Generating Plant—Philadelphia Electric Co., Philadelphia, Pa., is having plans prepared by the United Engineers & Constructors, Inc., Philadelphia, for a $27,000,000 electric generating plant slated for Phoenixville, Pa.

Interceptor Sewer—City of Livonia, Mich., plans seven mile interceptor sewer to cost $5,000,000. Plans are in progress and will be completed in August. Roth & Clark, Inc., Detroit, is consulting engineer.

Catalytic Cracking Plant—Union Oil Company of California, Los Angeles, Calif., plans catalytic cracking plant at Ventura. Project includes terminal, undersea pipe line and feeder lines. Estimated cost is $5,800,000.

Power Plant—Iowa Southern Utilities Co., Centerville, Ia., plans constructing power plant, near Eddyville, Ia. at about $8,000,000. H. W. Bender and Edward de Rivera are engineers for owner.

Truck Factory—Nacional Financiers, S. A., Mexico City, Mexico, plans to construct a truck factory in Mexico City, under contract with the Fiat Co., of Turin, Italy. Cost will be about $8,670,000.

Water Improvements—Ralph Civitarese, Hyde Park, Mass., was low bidder at $2,390,000 for waterworks improvements, when the City of Chicopee, Mass. opened bids Feb. 17. Haley & Ward, Boston, are engineers.

Harbor Improvements—City of Boston and Commonwealth of Massachusetts, Boston, plan new harbor facilities, at Northern Avenue, including a 3,100 ft wharf and filling-in two old piers. $4,100,000. M. A. Dyer Co., Boston, is engineer.

Dredging Los Angeles River—Peter Kiewit Sons Co., Arcadia, Calif., offered a low bid of $2,360,187 for dredging Los Angeles River, California, when the U. S. Engineers, Los Angeles, opened bids Feb. 20.

Power Plants and Transmission Lines—Iowa Power & Light Co., Des Moines, Ia. plans power plants, transmission lines and coal handling facilities throughout Iowa. Estimated cost is $3,000,000.

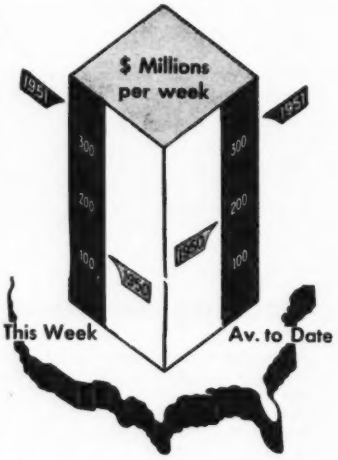
COSTS AND VOLUME

ENR INDEX NUMBERS

Index Base = 100	1913	1926	1949
Constr. Cost. Feb. 51	536.74	258.01	112.32
Bldg. Cost... Feb. '51	396.95	214.58	112.84
Volume ....Jan. '51	665	270	192

Activity This Week

As reported to ENR (in millions of dollars)



Amount of contracts let

	Week of Mar. 1 '51	Cumulative 9 wks 1951	1950	% chge
Federal	$25.0	$380.7	$346.7	+10
State & Mun.	52.5	619.6	460.8	+34
Total Public	$77.5	$1,000.3	$807.5	+24
Total Private	274.6	1,889.7	927.7	+104
U. S. Total	**$352.1**	**$2,890.0**	**$1,735.2**	**+67**

Contracts by type of work

	This Week	Cumulative 9 wks 1951	1950	% chge
Waterworks .	$4.4	$34.5	$62.1	−44
Sewerage ...	5.3	58.2	38.8	+50
Bridges	2.3	48.7	43.4	+12
Highways ...	20.6	152.9	135.6	+13
Earthwork, Waterways .	8.3	49.0	53.6	−9
Buildings:				
Public	31.8	450.3	386.3	+17
Housg., pub.	0.7	134.5	28.8	+367
Housg., priv.	33.6	395.3	544.7	−27
Commercial.	18.2	136.5	160.1	−15
Industrial ..	185.3	1,211.8	165.3	+633
Unclassified .	41.5	218.3	126.7	+72

NOTE: Minimum size projects included are: Waterworks and waterway projects, $34,000; other public works $60,000; industrial buildings, $82,000; other buildings, $300,000.

New capital for construction

	Cumulative 9 wks 1951	1950	% chge
Corporate Securities	$405.3	$396.8	+2
Fed. loans, Priv. Constr.	73.4	0	0
State and Mun.:			
Excl. housing ...	355.1	280.3	+27
Housing	148.8	160.0	−7
Fed. Aid, non-fed. constr.	0	0	0
Total Non-Federal.	$982.7	$837.0	+17
FEDERAL	2,602.4	0	0
Total Capital	**$3,585.1**	**$837.0**	**+328**

BUILDING DESIGNERS' LIBRARY

Major aluminum expansion planned

Aluminum capacity in the United States will be increased 200 million lbs annually on completion of a new Kaiser Aluminum & Chemical Co. expansion program which primarily involves construction of a New Orleans reduction plant, an adjacent power plant, and the development of bauxite properties in Jamaica. Three aluminum developments in the Pacific Northwest also were announced during the past week.

The company will rush project construction to start production by the end of this year and have all four pot lines in operation by mid-1952.

The new plant will be the third largest primary aluminum producing plant in the U. S. to bring Kaiser Aluminum's capacity to 540 million lb of pig aluminum annually.

The power plant to serve the new aluminum facility will use natural gas to generate electricity. United Gas Pipeline Co. has entered a long-term contract to supply up to 70 million cu ft of the fuel per day.

Development of the new source of bauxite ore will include mining operations and the providing of port and shipping facilities. Baton Rouge plant capacity will be increased 80%.

Kaiser has purchased a 280-acre site on the Mississippi River for the new facility, directly on deep water for ocean shipping. More than 1,000 persons will be employed at the reduction and power plants.

Private financing totaling $115 million was arranged for the Kaiser expansion program, $40,000,000 to retire mortgages on five of their existing plants.

The Pacific Northwest may be able to supplement aluminum output in its area as two aluminum companies seek sites with sufficient power for construction.

The Harvey Machine Co of Los Angeles has under consideration a $15,000,000 bauxite reduction plant on the Columbia River at either Portland, Ore., Longview, Wash., or along Puget Sound.

The Chelan County PUD of Wenatchee, Wash., is being urged to supply power for this project at a firm offer of 150,000 kilowatt of additional capacity to come from the Rock Island dam of Puget Sound Power and Light Co.

Eastern Metal Products Co. of Tuckahoe, N. Y., has five sites under consideration in western Washington-Vancouver, Longview, Tacoma, Bellingham and Everett. A total of 1200 men would be employed in the completed works. A contract with the Bonneville Power Administration for 110,000 kw is said to exist.

Kaiser has also activated a new seventh pot line at the company's Mead aluminum reduction plant at Spokane, Wash., upping capacity there to 340,000,000 lbs annually. Pots were purchased from the government's wartime plant at Riverside, Calif.

Irrigation water to flow through Continental Divide

First irrigation water in substantial amounts to hit the east slope of the Continental Divide from Grand Lake, on the western slope, will be delivered to northeastern Colorado this spring, according to the Bureau of Reclamation.

Filling of Horsetooth Reservoir, west of Fort Collins, Colo., is to begin in February, and irrigation water will be available soon thereafter. Water from the western slope will come through the Alva B. Adams tunnel to the new Estes Park power plant, where bureau engineers are now testing generators. From the afterbay of that plant it will flow into the Big Thompson River, through the Dille tunnel and Horsetooth feeder canal into Horsetooth Reservoir.

The $12.5 million Alva B. Adams tunnel, constructed in 1940-1946, conveys the surplus water from the Colorado River watershed on the western slope through the Continental Divide.

N. Y. building commission drafts code for state

New York state municipalities and engineering groups have three months to study a newly drafted code for the construction of one and two family dwellings put out this week by the New York State Building Code Commission.

With the code, which itself is comparatively brief, the Commission is sending along a 280-page illustrated manual indicating various test procedures and construction methods acceptable under the code.

The effort of the commission is to gain the acceptance of its new, up-to-date draft after receiving written criticism and comment from the 1,567 municipalities involved and the more than 1,000 national, regional, state and local bodies interested in its work.

From this material a final code will be drafted and presented to local centers sometime late this spring. Adoption of the code is then automatic in all towns where it is not specifically rejected, and specific regulations substituted for the new code provisions.

Zoning regulations are not affected.

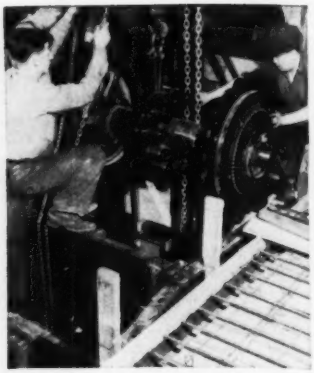
Structural, fire-safety, and sanitation requirements based on criteria from research and testing laboratories and other organizations are included.

The commission is headed by Col. Edward J. McGrew, Jr., now on military leave. Other members: George Bain Cummings, vice-chairman, Walker S. Lee, architect and engineer, Ralph A. Lehr, of Buffalo, and William Lescaze, New York architect.

ISLAND CONNECTION—Bethlehem Steel Co. traveler on structure of new vehicular bridge from Moonhead, Squantum to Long Island in Boston Harbor, after erection of 60-ft girder span and 250-ft deck truss out to first water pier. Other spans are erected on barges and floated into position. Two high piers in background will receive a through truss span to provide a 50-ft clearance over the channel. Merritt-Chapman & Scott built piers, abutments and shore approaches. Crandall Engineering Co., Boston, are consulting engineers.

1. TRUSSED FRAMEWORK of moving stairway is fitted in opening. Next . . .

2. WORKMEN fasten brackets that carry balustrade and handrail. Then . . .



3. SPROCKET ASSEMBLIES and motor are lowered into place, after which . . .

Prime factors in planning for moving stairs

Raymond W. Detrick
Application Engineer, Elevator Division
Westinghouse Electric Corp.
Jersey City, N. J.

INCREASING DEMAND for moving stairways for all types of buildings make it essential that building designers be familiar with the requirements of this type of installation.

Moving stairways are used in department stores, factories, railroad terminals, airports, office buildings and many public buildings. On Navy aircraft carriers, during World War II, they moved men swiftly to battle stations and planes.

Principal advantage of moving stairways over other means of vertical transportation is their ability to handle dense traffic. Large department stores, for example, provide vertical-transportation facilities for one person per hour for every 20 to 25 sq ft of sales area above the entrance floor. Moving stairways generally carry 75 to 90% of the traffic, elevators the balance.

• **Stairway design**—A moving stairway is simply an inclined bridge spanning from floor to floor. It consists of a steel trussed framework, handrails and an endless belt of steps. At the upper end is a pair of motor-driven sprocket wheels and a worm-gear driving machine; at the bottom is a matching pair of sprocket wheels. Two precision-made roller chains travel over the sprockets, pulling the endless belt of steps around on an accurately made set of tracks attached to the trusses. Each step is supported on four resilient rollers.

Moving stairways travel at a generally accepted speed of 90 fpm on a 30-deg incline, though sometimes buyers specifically request other speeds. (Fastest in the country are the stairways in the Esso Building, New York City, which move at 125 fpm.)

Once the speed of travel has been decided upon, the width of step determines stairway capacity. Standard widths range from 2 to 4 ft., and rated capacities vary from 4,000 to 8,000 persons per hour.

Recently, manufacturers introduced a new stairway for sale at a relatively low cost. Having the same high quality and many of the features of larger models, it is 32 in. wide—sufficient to carry an adult and child on one step. Rated capacity is 5,000 passengers per hour. One stairway occupies about the same space as 10 elevators, but continuously handles the same number of passengers as 20 elevators. Operation costs are low; the Westinghouse model costs only $8.50 per day, including amortization, maintenance, power consumption, interest and insurance.

• **Where to put them**—Proper location of moving stairways is very important if maximum traffic efficiency is to be obtained and crowding of passageways is to be prevented. Before deciding where these stairways should be installed, building designers should study carefully the traffic-flow pattern of the building and its direction.

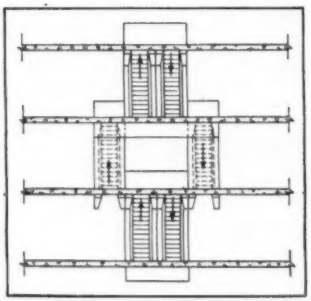
Stairways should be installed where traffic is heaviest and where convenient to passengers. Their location should be readily discernible to people approaching them. In stores, moving stairways should lead to strategic sales areas.

• **Structural support**—In planning a stairway installation, building designers should keep two factors in mind:

1. During the design stages of a new building, adequate space should be allotted, and sufficient structural steel or reinforced concrete should be provided to support the stairway. For an existing building, though, careful study must be made to determine the necessary alterations to assure adequate space and supports.

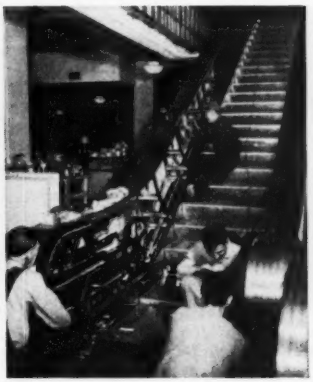
2. Floor-to-floor heights must be considered in determining loads on the supporting members. For instance, 32-in. wide stairways are designed for a maximum vertical span of 23 ft, and if the floor height is less than 20 ft, structural support is required only at the top and bottom. Standard heavy-type stairways are designed for a greater rise, depending on width and adaptability to the specific building.

Consider, for example, installation of a 32-in. moving stairway in a new building with 17-ft story heights. Data

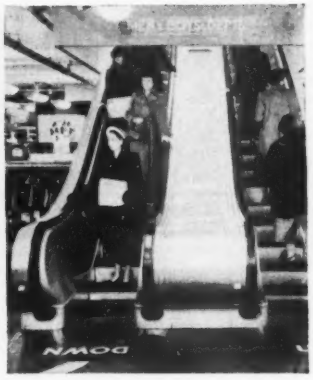


7. PARALLEL ARRANGEMENT of stairways is not as compact as . . .

4. COMB PLATE and floor pans are set at correct level at top of stairs. Later . . .



5. BALUSTRADES are attached and steps installed. Finally . . .

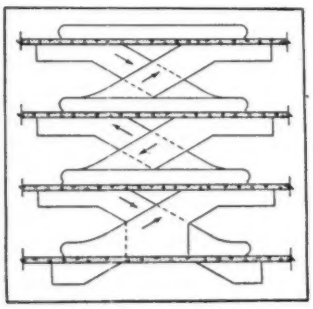


6. STAIRWAY is completed with addition of handrails and side panels.

supplied by the manufacturer indicate that stairway end reactions total 17,115 lb. These reactions include dead and live load on the stairway, plus a safety factor, but no allowance is made for dead and live load on adjoining floors.

At the ends of the stairway opening, therefore, structural steel or reinforced concrete beams of sufficient size must be provided to support a load equal to 17,115 lb plus floor loads. Also, a structural steel or concrete frame must be installed along the sides of the opening to carry the floor and wellway railing. The stairway is independent of this frame.

Framing for existing buildings would be about the same, but there would be an additional problem of determining which of the existing structural members need strengthening and how much. Also, when it is necessary to install a large, standard-type stairway that does not house the driving machine inside the trussed framework, building beams must be cut to permit passage of the drive chain. Either these beams must then be reinforced or additional beams added.



8. CRISS-CROSS ARRANGEMENT, which requires less walking.

• **Installation**—Moving stairways are "tailor-made" for the building to be served. When each part gets to the job, it must fit perfectly into the overall assembly to assure smooth, quiet operation, and the assembly must fit exactly into the allotted space in the building.

Stairway design permits a vertical variation of ½ in. in the elevation of supporting beams from the specified floor-to-floor height. The stairway is shimmed to bring it level. If variations in elevation exceed ½ in., great difficulty in installation results, as well as loss of time. Similarly, when upper and lower beams are too far apart horizontally, an extension must be added to the trussed framework.

Trusses are usually built and shipped in three sections. At the job site, they are assembled and raised into position with chain hoists, either through an elevator shaft or on the outside of the building.

Exterior treatment of the balustrade and wellway railings may be furnished by the stairway manufacturer or the owner. Frequently, plaster is specified, and the owner's forces apply it.

• **Stairway arrangements**—Moving stairways are generally installed in pairs—one for carrying traffic up and the other for moving traffic down. These stairways may be placed parallel to each other (Fig. 7) or criss-crossed (Fig. 8).

Criss-crossed stairways are usually preferred: In the parallel arrangement, stairways in alternate stories are separated by the width of the two stairways in adjoining stories. The criss-cross arrangement, therefore, is more compact, reducing walking distance between stairways at various floors to a minimum.

• **Fire protection**—When required, fire-protection devices may be incorporated with the stairway installation. These may take the form of rolling steel shutters, which are electrically or manually operated to close a stairwell. Or a combination exhaust system and sprinkler system may be installed (ENR July 22, 1948, p 51).

Purpose of the exhaust system is to prevent up draft of fumes, and a water spray is used to eliminate convection currents. A collection duct is placed around the stairwell at ceiling level in each story. At the bottom outside edge of the duct, there is a continuous intake slot through which hot air, fire gases and smoke are drawn. Branches connect collection ducts to a riser through which fumes are drawn and exhausted by a centrifugal-type fan. Each branch is equipped with a damper, which opens automatically when a fire occurs in that story. Simultaneously, a fresh air-intake is opened.

To create the water spray, open sprinkler heads with ⅜-in. orifices are placed around the exposed sides of the opening. These produce a continuous curtain of water when a thermal-responsive device opens a flooding valve. Heads are spaced about 4 ft apart and 1 ft from the opening. Pressure is at least 20 psi, and piping is designed to assure substantially the same discharge from each sprinkler.

Proper drainage facilities are installed throughout the system. And all parts are readily accessible for manual operation, test and inspection.

In choosing between moving stairways and other means of vertical transportation, building designers should recognize that price is not a prime consideration. The stairways are attractive and compact. They are convenient, safe and comfortable to ride. And in stores, they have proved a sales stimulant.

Letter from India:

India stakes future on her rivers

BANGALORE, INDIA, JAN. 30—What happens in the next five years at the four locations spotted on the accompanying map will largely determine the future of the new republic of India, which celebrated its first anniversary only four days ago. These are the sites of the largest and most important river development projects that are currently in the construction stage.

Imbued with a fierce ambition to fashion their country in a modern mold, Indian engineers have numerous other projects in the design stage —one larger than any of the present ones, the others smaller.

But these are mostly "play" projects for the planners. They stand little hope of becoming realities unless India can prove its capabilities on the four biggest jobs now under way. It is on them that India has staked her future. Failure here means failure everywhere — economically, socially, and what may be more controlling, psychologically, not only in the eyes of the Indian people, but in those of other nations to whom India must look for help both technical and financial.

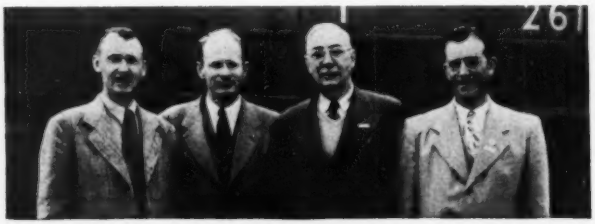
From north to south—and from largest to smallest—these projects comprise: (1) Bhakra and Nangal dams on the Sutlej River; (2) Tilaiva, Konar, Maithon and Planchett Hill dams on the Damoder River, supplemented by a steam power station at Bokarno; (3) Hiracud dam on the Mahanadi River; and (4) Tungabadra dam on a tributary (of the same name) of the Kistna River.

• India's hope is in her rivers—It has required some 5,000 miles of travel in India to see these four projects, and one cannot look back on them without some such appraisal as given above. Moreover, there is much support for this viewpoint among the 200 foreign engineers from about 30 countries who are on this study tour. At the same time there is general agreement that India is on the right track in placing her hopes on her rivers.

India's first need is more food for her great and growing population. Therefore, the irrigation aspect of the four projects is properly accorded first importance. Upon completion they will add about 6 million acres of new farming land, which represents a 12% increase on the present irrigated acreage—already the largest in the world.

Secondly, India requires power for new industry. She has coal, but it is concentrated in a few areas, and is only estimated to be sufficient for 70 years even at present rates of consumption. On the other hand, her water power resources are tremendous. The Himalayan snows feed the large rivers of the north, while the monsoon rains of the summer months fill to overflowing equally large streams in other parts of the country. However, without dams, most of this water is wasted to the sea.

Only in a few places—around Bombay and in Madras and Mysore states in the south—has any appreciable hydro power development occurred. It totals the insignificant sum of 531,877



DELEGATES Waldo G. Bowman; J. H. Douma, office of the Chief of Engineers; L. N. McClellan, chief engineer, U. S. Bureau of Reclamation, and Col. Howard Ayres, economic and scientific section, General MacArthur's headquarters, Tokyo, pose during sessions at New Delhi.

Letter from the editor

Bangalore, India, Feb. 2

Dear Staff:

Here is story #3, and some pictures to go with it. I am finishing it up in this pleasant city of 600,000 after having done the bulk of it on my lap in the train. We finished the tour last night (16 days of train living) and I am not sorry. It was, however, a wonderful experience.

You may recall that there was some doubt whether I would be named a member of the U. S. delegation because of the lack of an FBI check on me. Apparently that was made and my official notification came after I had been here a week. Now, I am the head of the U. S. delegation, and have been for the past eight days since Gail Hathaway left for the Houston meeting. As a result I have had to make all the speeches and sit with all the front table blokes, including the Maharaja of Mysore. There's a fabulous guy for you! His main palace has solid gold and silver doors, chairs, and bric-a-brac—and some of the chairs are even of cut glass. The buttons on his tunic are set in diamonds and rubies. Last night he lit up the palace for us. It is about the size of the Capitol in Washington, with towers, turrets, etc., and it was completely outlined in 100,000 (more or less) light bulbs. Imagine something a hundred times bigger than Coney Island's lighted building, and you get an idea. Pretty vulgar close up, but an unbelievably beautiful sight from a distance.

This is the only really nice town in India according to what I hear and what I have seen. The climate is like Denver (it is 3,000 ft elev.), the streets are wide, the buildings masonry and there are many parks. It, like Mysore City, which runs it a close second, is in the realm of the Maharaja.

Tomorrow I take off for Cairo, and then try to get into Israel. I won't know whether the Egyptians will let me until I get there. I've gone to a lot of trouble to make arrangements and it will delay my schedule, but it seems a mistake not to see what the Israelis are up to, now that I am out here.

Waldo

kw installed capacity, of which the Tata Industries (ENR Feb. 8, p 99) account for 244,000 kw, or nearly half. It is, therefore, amply significant that the four projects now under way are planned to provide nearly 1,500,000 kw of capacity, of which perhaps half, or 700,000 kw, is envisioned as the initial installation.

The third aspect of the projects is flood control, which, particularly in the Damoder valley, is counted upon to increase the nation's industrial potential by cutting down on almost annual destruction during the monsoon season.

• **Help needed**—Granted the ability to summon a will to build and complete projects equal to the enthusiasm and courage with which they conceive and design them, Indian engineers will make these great dreams come true in time to avert serious dissatisfaction—and worse—on the part of their country's people.

To do this, however, many of the foreign observers believe that India must forego—at least on these initial jobs—the idea that these projects are essentially training schools for Indian engineers and construction men. Great as the advantages might be, completion of the work may well be too long delayed. By drawing on competent foreign supervision and modern machine methods the jobs can be speeded to a degree that will make accomplishment match the schedules that the Indians themselves have laid down.

There is, of course, precedent for both theories in completed Indian hydro projects. The Tatas employed both foreign engineers and foreign capital to construct—in the Bombay region—the three hydro-electric installations that provide nearly half of India's hydro power.

As opposed to this, the Madras government built Mettur dam (1937) with its own resources and methods. It is 5,300 ft long, partly in cyclopean concrete and partly in masonry, and furnishes 50,000 kw of generating capacity as well as water for several hundred thousand acres of irrigation.

A similar achievement was recorded by the Mysore government in 1948 when the magnificent Jog Falls was harnessed by the Hirebhasgar dam upstream and the Mahatma Gandhi power station below. Four 12,000-kw units are operating, and four 18,000-kw units are currently being installed.

Yet both the Madras and Mysore projects required a long time to build by modern standards. The question that has to be resolved on the four new projects that are now under way is whether they can be built leisurely and treated as training schools, or speeded up by full resort to modern methods.

LABOR—INDIAN STYLE—This man and his family, all but the smallest employed on construction work, are typical of workers building for India's future.

What are these new projects and what actually is being accomplished at their sites? A brief review here will be supplemented later by more detailed description.

• **Geography lesson**—As background, it may be useful to recall the main characteristics of India's geography.

Across the northern boundary the high Himalaya Mountains form a cold-weather barrier and a watershed. About 500 miles south is another east-west range of mountains—the Vindhya's—and between the two are the great plains of the Indus and the Ganges Rivers.

The Indus, flowing south in the northwest corner of the country, is now largely in Pakistan although its headwaters are still in India. The Ganges flows south for a hundred miles and then almost directly east for more than a thousand. The divide between the watersheds of these two rivers, near Delhi, is so low as to be invisible to the naked eye, so that the north part of India is one vast plain.

The southern part of India, below the latitude of Calcutta, is an equilateral triangle, 1,100 miles on a side, and a great plateau on which all but two of the rivers flow from west to east. Because the plateau is highest on the west, very little of the rain from the southwest monsoon reaches it, being caught by the Western Ghats, as the north-south range is called.

It is the southeast monsoon—June to September—that brings some water to the rivers of the plateau, although part of this is lost in a range of mountains called the Eastern Ghats, (really the eastern escarpment of the plateau itself.) Nothing impedes the progress of the monsoon up the Ganges valley, however, which accounts for its relative fertility.

Only impounded water can bring fertility to southern India, except for the narrow coastal plains that surround the plateau. And because the great Thar Desert in the northwest blocks the southwest monsoon from the Upper Ganges valley, this region too requires reservoirs to save the seasonal water that reaches it from the southeast.

This is the geography that forces India to stake its future on the dams described below.

Bhakra and Nangal Dams

Located eight miles apart, Bhakra and Nangal dams are the principal structures of India's greatest irrigation and hydro scheme—3 million acres and 1.3 million kw. Bhakra plugs a gorge in the front range of the Himalayas to form a 7.4 million acre-ft reservoir of which 5.73 million acre-ft can be utilized. A straight gravity structure of concrete, it will be 680 ft high, 1,700 ft long and require 5.12 million cu yd of concrete, placing it in the ranks of the world's largest.

The initial powerhouse, on the left bank, will be of conventional type and house four 93,300-kw units. A second power house, on the right bank, although only a long-shot pos-

TRUCKS take out muck from tunnel outlet at Bhakra Dam, but hand labor does excavating and mucking.

HAND LABOR built these piers for gates at Nangal Dam, but machines do heavy fill work.

sibility, is shown on the plans as being just twice as large as power house No. 1 and to be located underground in a tunnel 500 ft long, 80 ft wide and 140 ft high—a tremendous excavation by any standard.

At Bhakra at the present time, the principal operation is the driving of two diversion tunnels of the unusual size of 50-ft diameter to the inside of the 2½ ft concrete lining. This means they are excavated to 60-ft dia to accommodate ribbing and lining.

The design of the tunnels is based on model experiments carried out at the U. S. Bureau of Reclamation laboratories. In this connection, also, it may be noted that J. L. Savage, former design engineer of the bureau, has been Bhakra's chief consultant.

• **Hand labor is rule**—The work is being done mostly by hand labor although a few Euclid wagons, Kochring Dumptors and Muir-Hill trucks (a British product similar to the Dumptors) are being used for the hauling.

An 8x10 ft pilot heading at the crown of the main tunnel section has been excavated for the entire 2,500 ft length of each tunnel, and it is the enlargement work that is now under way. The rock is a weak sandstone with many clay seams, so that heavy structural steel ribs have to be set on 2 to 4 ft centers, with precast concrete lagging inserted in the worst places.

Concrete lining jumbos are being built in the job's extensive shops where the penstocks and scroll cases will also be fabricated. Plant is also being assembled for a start on the dam itself, scheduled for the fall of 1952.

Nangal dam downstream of Bhakra (and a part of the same project) is a diversion structure for a canal upon which two power stations will be installed. Now about 80% complete the dam will be 955 ft long and 95 ft high and consist of 26 gated bays of 30 ft each separated by 7-ft wide piers. Adjacent to the left abutment of the dam is the head regulator for the canal, which consists of eight 24-ft bays capable of passing the canal's capacity of 12,500 cfs.

• **40-mile canal**—The Nangal hydel (for hydro-electric) canal will be 40 miles long and is being dug through very difficult mountainous territory. Intersected streams are being carried over or under the canal, and some of these are of quite large size, one having an annual flood of 12,000 cfs. The power plants, one 12 miles and the other 19 miles from the headworks, will each house three 24,000-kw units operating under heads of from 90 to 100 ft. Most of the Nangal work is being done by hand labor.

At the foot of the Nangal canal an irrigation canal is planned to begin. It too will have a capacity of 12,500 cfs and will extend for 108 miles.

Damoder Valley Project

Of the four large schemes under way, that embracing the valley of the Damoder River, which extends some 300 miles westward from Calcutta, holds the greatest significance for India. The valley contains the bulk of India's coal, some of its iron ore and mica, and 5 million people who are able to get only one crop of rice a year because of a lack of irrigation.

• **Flood control first**—So violent and destructive are the floods of the monsoon season, however, that the stream has acquired the name of the River of Sorrows.

Flood control was, therefore, the first improvement sought for the valley, but the project soon developed into what the Indians refer to as their TVA. Now included are eight dams in the upstream portions which will have an installed capacity in power plants of 240,000 kw and a storage capacity capable of protecting the valley against a flood of 1 million cfs, or 30% greater than the highest on record.

In addition to the hydel plants there will be a 200,000-kw steam station in the upper valley. In the lower valley, assured year-round water will be available to 1 million acres of rice land. Land reclamation, by terracing, contour plowing and soil erosion dams, is also involved.

About 200 miles up the valley, a principal tributary, the Barakar, branches off, and it is above this point, on both streams, that the dams are located. There are three dams on the Baraker. The largest, Maithon, just above the mouth is ready for construction to start this fall. The smallest, Tilaiva—and the farthest upstream—is under way, while the middle one, Balpahari, is still in preliminary stages.

• **Five dams on the Damoder**—On the Damoder itself there will be four storage dams upstream of the Barakar junction and an irrigation diversion dam below that point.

One of the four storage dams, the farthest downstream, will be similar

MAP LOCATES SITES of the great river development projects planned for India.

in form and function to Maithon dam. Known as Planchett Hill dam, it is not yet beyond the design stage. The only one of these dams now under way is Konar on a tributary of the same name, and its primary purpose is to assure a supply of condensing water to the steam power station under construction a few miles southeast. With 200,000-kw capacity this will be by far the largest steam station in India and comparable to the best anywhere.

At both Tilaiya and Konar, progress so far has been slow because hand methods predominate, but The Damoder Valley Corporation (modeled directly after the Tennessee Valley Authority), which has the project in charge, has committed itself to as quick mechanization as possible. In this regard it is interesting to note that its three-man consulting board contains two Americans—L. F. Harza, chairman, and S. O. Harper—and that it has recently hired A. M. Komora, another American, as chief engineer.

Tilaiya is a concrete dam, and is destined to have a modern central mixing plant and long-boomed crawler cranes with 2-yd buckets to place the concrete. This job is also being supervised in the field and the design office by Mr. Harza's consulting firm.

Konar, an earthdam with a concrete spillway, is being designed and supervised by a Swiss firm, Grunner Brothers. Here, too, the hand methods are gradually being replaced with heavy earthmoving machinery.

The Mahanadi Valley

Unlike the fairly well developed Damoder Valley, the valley of the Mahanadi River in Orissa State is largely a wilderness, albeit a rich one with large deposits of coal, iron, bauxite, manganese, chromite and mica as well as vast areas of potential agricultural land.

Famine and floods have devastated the lower valley for hundreds of years, and some method of control of the river has been dreamed of for the past century. Since the river annually carries 74 million acre-ft of water, concentrated during the monsoon months, only large scale development offered a practicable solution.

• **One started**—The project now envisioned will require three dams on the Mahanadi. The easiest to build and fartherest upstream, called Hiracud, is under construction. The main dam of earth with concrete spillway sections either side of an existing island in the river will be 15,800 ft long (maximum height 180 ft) and there will be 17 miles of earth dikes to plug saddles around the reservoir area. The spillway sections total 3,700 ft in length. The reservoir capacity will total 5.98 million acre-ft of which 3.74 will be utilizable.

The power house will provide for six 37,500-kw units of which two will be installed initially. Discharge from the power house will be carried to a second reservoir 14 miles downstream where, in connection with a second dam, there will be a power plant of four 24,000-kw units of which two will be installed initially. According to present schedules this power house will go into service first.

Below this second power house, two flow canals and four lift canals for irrigation will take off. They will total 238 miles and will irrigate 875,000 acres.

• **Navigation too**—Navigation is also a part of the plan, since the country has few railroads and very poor highways. There is even the expressed hope that development of the valley, which would follow irrigation and power facilities, would require a new port at the sea outlet of the river that could rival the Calcutta of today.

Although the majority of the work to date has been done by manual methods (30,000 men total) there are more than 100 pieces of heavy earth-moving equipment on the job (mostly U. S. army surplus), but more new units are on order.

On the main dam, designed by the International Engineering Co. (U. S.), excavation of the spillway foundations for a length of 2,000 ft has been completed. About a half million cu yd of earthwork has been placed in one of the dikes, while a quarter million has been placed in the subsidiary dam downstream. Excavation of the power canal between the two dams is also under way.

• **Jobs aplenty**—The current economic importance of the project rests mainly in the jobs it is providing for thousands of laborers from the neighboring districts, and in the training it is giving Indians in operating heavy equipment and keeping it in repair.

From a technical standpoint the job commands a particular distinction from a bridge built largely of precast units, about which more will be said in a later article.

Tungabadra Dam

Although most current dam thinking in India is centered on concrete or earth sections, one of the most interesting structures (and the best organized from a construction standpoint) is of stone masonry. This is the Tungabadra Dam on a tributary of the Kistna River. Built primarily for irrigation, it will also provide incidental hydro power and be an aid

to navigation in the future.

• **Why masonry?**—There is a good reason why a hand-built masonry dam was chosen for the Tungabadra site.

In the first place this is not a federal project, as are the others, but a joint undertaking of the states of Madras and Hyderabad.

Masonry is the common construction for dams in these areas, and the great Mettur Dam (214-ft high and 5,300-ft long) completed by Madras in 1937 on the Cauvery River furnished a powerful precedent, even though the interior is cyclopean instead of hand-placed masonry. Expert masons are also available, good granite can be quarried nearby, and Mettur has proved that an unusually good mortar can be made by adding brick dust to the normal ingredients. One part of the brick powder, called surki, to four parts of cement is used for the front 9 ft of the Tungabadra spillway section. For the inside of the dam, the red cement mortar is leaner—1:4. A 1:1:1 mix of lime, brick dust and cement is used for the sections flanking the spillway.

• **One of biggest**—Tungabadra Dam will be one of the largest masonry dams ever built. Although not as high as Mettur (160 ft) it is 8,000 ft long and entirely of hand-placed stone. The volume of stone alone, exclusive of mortar, is 1.2 million cu yd. Probably 60 million separate stones will have to be placed before the dam is complete.

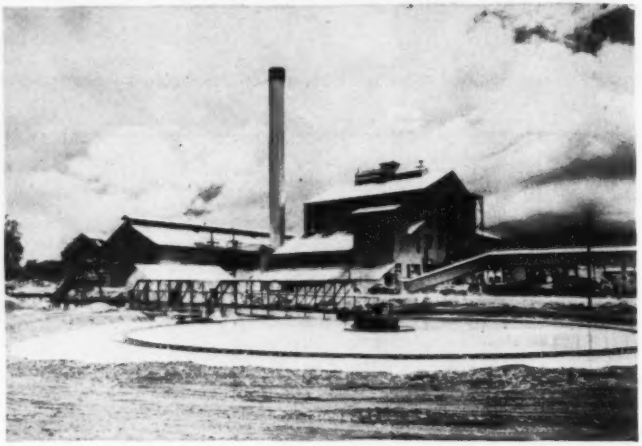
To accomplish this herculean task, 20,000 workers are employed in two eight-hour shifts. On the irrigation canals downstream another 40,000 are said to be working. It is a tremendous employment-giving project, and in addition will produce a fine, sound structure, although at a terribly slow pace.

The project involves a power plant on the Madras side in which the initial installation will be three 7,500-kw units. Two more units can be added. On the Hyderabad side, power will be generated at the dam and at four drops in the canal, with a total ultimate capacity of 110,000 kw. The Madras irrigation canal will be 225-miles long and that on the opposite bank 127 miles. The respective capacities are 70,000 cfs and 2,500 cfs.

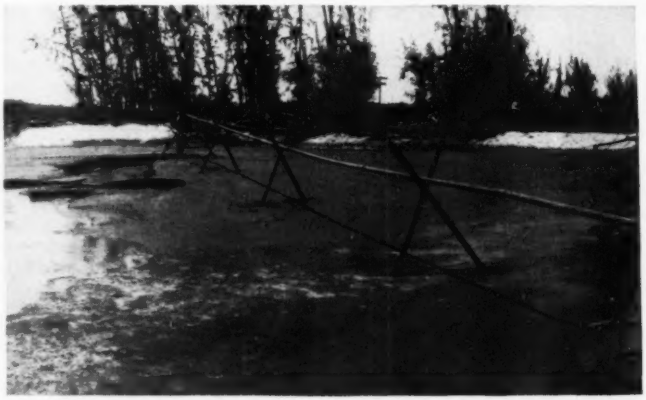
One of the structures on the Madras canal will be a twin-box aqueduct, 12x9 ft, over the Hagari River. Nearly 2,300 ft long, it is already more than half finished, and will be the largest in India.

At the dam itself, the entire 21 million cu ft of excavation has been completed.

Sugar-mill water reclaimed —rich soil is a by-product



SETTLING BASIN at a sugar mill in Hawaii separates soil and water, reclaiming both for further use. Before installing this unit, sugar cane wash water was used for irrigation but the soil in it choked the ditches.



RECLAIMED SOIL, pumped through a 5-in. pipeline, builds up new cane planting areas. This soil is so rich that irrigation and fertilization must be kept to a minimum lest the resulting plant be all leaves and no cane.

Two Hawaiian sugar mills have recently solved water reclamation problems by installation of 150-ft dia clarifiers. Besides getting clear water, valuable soil is reclaimed.

The water is first used to wash raw sugar cane as it comes from the fields. Soil is picked up in such quantities that the water cannot be used for irrigation without choking the ditches and clogging the fields.

Each mill expects to reclaim from 30 to 50 acre-ft of soil a year to be used in building new fields and enriching old ones. Main problem is the richness of the soil. Irrigation and fertilization must be carefully controlled; otherwise, the cane will put all its energy into leaves instead of sugar.

The units are installed in circular basins dug into the ground. No concrete lining is believed necessary. A collecting weir encircles the path of the clarifier arm.

The two mills are the Ewa Plantation Co. and the Waialua Agricultural Co., Ltd. Allan A. Duvall, territorial representative for the Dorr Co., advised the companies in planning the installations.

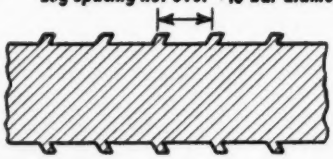
Reinforcing Bars
HAVE TO BE GOOD...
to meet ASTM A305

ASTM SPECIFICATION A305-50T REQUIRES

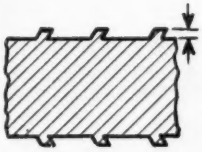
1. *Must be 45° or over*

From 45° to 70°, the lugs must reverse in direction on each side or on opposite sides

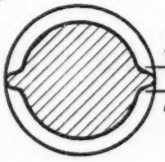
2. *Lug spacing not over 7/10 bar diameter*



3. Lug height must be at least 4 to 5% of nominal bar diameter



4. Gap or longitudinal rib width must not exceed 12½% of nominal perimeter of bar

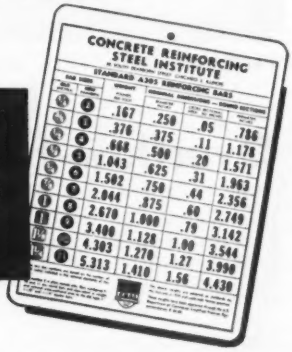


When you specify reinforcing bars that meet ASTM A305-50T, you *know* these bars will have high bonding strength. For Specification A305 sets up rigid standards as to the direction, height, and spacing of lugs on the bar. Improved bars that can meet these specifications provide high bonding strength that reduces the size of tension cracks and often eliminates the need for hook anchorage.

Some codes already permit greater bonding stresses and elimination of hook anchorage when ASTM A305 bars are used. Similar changes in the ACI Building Code are awaiting final approval.

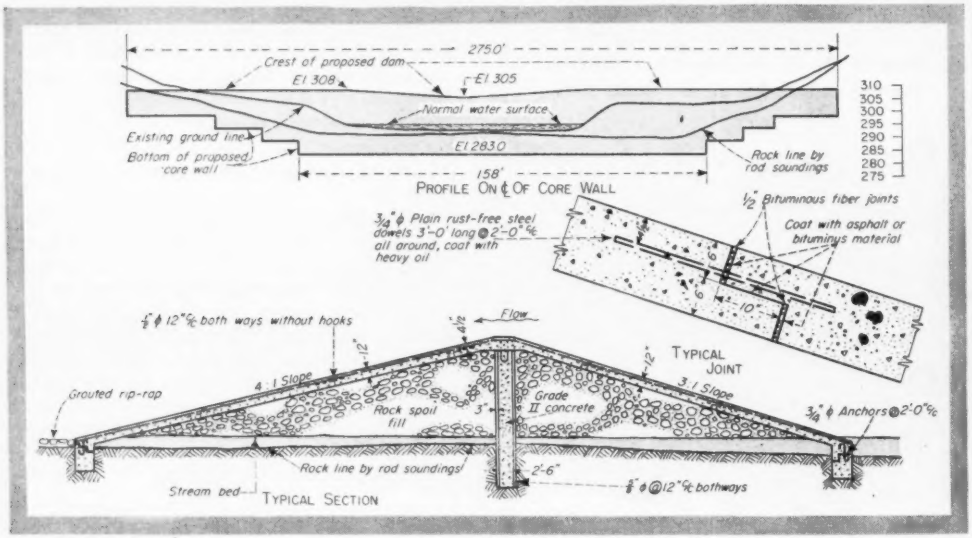
You can be assured that any bar that meets ASTM Specification A305 will make possible new economies in design, and sounder, more permanent structures. Your reinforcing bar fabricator is now offering bars that meet these standards. When indicating the size, use the new number designation. A new bar chart, covering these designations, will be sent upon request.

Write for *FREE* NEW BAR CARD



CONCRETE REINFORCING STEEL INSTITUTE • 38 S. Dearborn St., Chicago 3

BARRICADING the Patapsco River, a low overflow-type dam will divert water to Baltimore as soon as the Liberty Road tunnel is finished. Intake is in foreground. River flow is maintained through a gated box spillway.



PAVED WITH CONCRETE, flood flows can pass over the dam without damage to the structure. The depression in the crest's midpoint tends to centralize overflow.

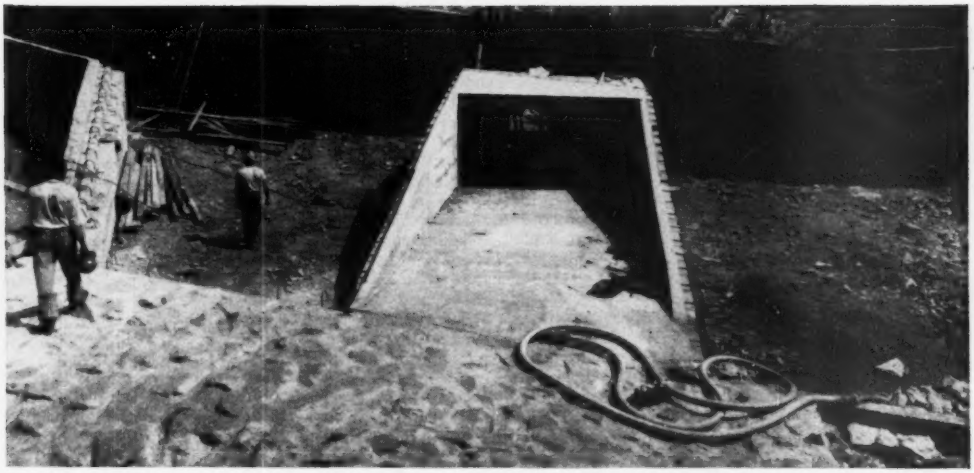
Overflow-type dam diverts water to city

BALTIMORE will get water from the proposed Patapsco River development—well before construction begins on the big concrete gravity dam planned as the project's principal structure.

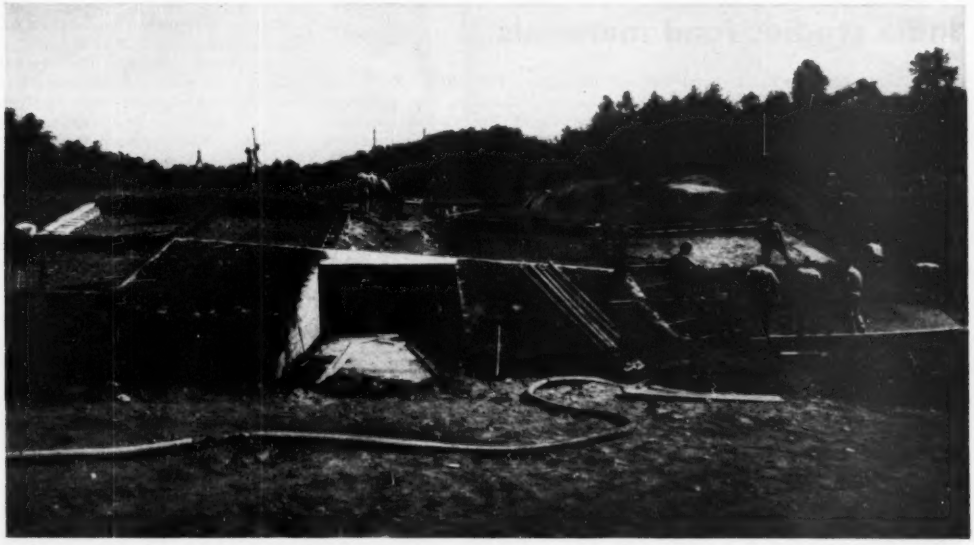
An increase of 50 mgd in the city's supply is being made possible by an overflow-type diversion dam. Located just below the inlet to the Liberty Road tunnel, the dam blocks off the river channel and will turn water into the tunnel's temporary intake. Diversion is expected to start sometime in March, 1951.

• **The dam**—It's about 225 ft wide at the crest and about 16 ft above the stream bed. The crest has a three-foot depression at the mid-point. This will channel first overflow along the center of the stream bed, thus protecting the river's banks from being washed out.

The dam slopes are: Upstream—1 on 3 and downstream—1 on 4, both faces being paved with concrete The pavement is over compacted



CUTOFF WALLS at the toes of slopes are tied to the concrete pavement with hooked bars. Rock and mortar pavement downstream from the spillway box discourages scour.



SLOPES were paved in skew sections. Reinforcement was supported so as to be 3-in. below the exposed surface. Careful curing with hay and water made strong concrete.

rock fill made from the tunnel spoil.

The 12-in. pavement is reinforced with 0.5-in. bars at 12-in. centers in both directions. Reinforcing is 3 in. below the exposed face.

The concrete pavement was placed in skew sections (rhombus) about 16 ft on each side. Sections adjacent to natural earth, however, have irregular shapes.

Joints on all sides of the sections overlap 10 in. and have 0.625-in. dowels on 17-in. centers. Dowels are coated with heavy oil. The over-lap surface was painted with asphaltic material before the upper concrete was poured. Exposed as well as concealed joints are filled with 0.5-in. bituminous fiber.

A core wall directly under the crest is the dam's backbone. It is 2.5 ft thick and extends down 4 to 6 ft into solid rock. This insures that no water will seep through the structure.

Reinforcement for the core wall is 0.625-in. spaced 12 in. on centers horizontally and vertically. The reinforcement is placed 3 in. from wall surfaces.

Cutoff walls at the toes of both slopes are 2.5 ft thick. They extend three feet down in solid rock. Slopes are anchored to them through construction joints with 0.75-in. bars with hooks on each end. Spacing of hooked bars is two feet apart.

All exposed concrete was specified to have a 28-day compressive strength of 3,000 psi. Actual strengths of the

air-entrained concrete varied from 3,000 to 4,000 psi.

• **Maintaining river discharge**—All of the river's flow is diverted to the city's water-supply system. The only flow downstream will be that overflowing the dam. Negotiations are progressing with riparian owners to compensate them for damages resulting from stream diversion.

Flow in the Patapsco River is maintained through a box spillway that pierces the dam. It's 12 ft wide and 5.5 ft high, is of reinforced concrete. And is based on the river bed.

Two sluice gates, each 5 ft wide and 5 ft high, are built into the flume in line with the crest and corewall. They are manually raised and lowered by a crank-and-worm lift.

The stream bed at the toe of the downstream slope is paved with rough, irregular rock and mortar—18-in. thick—for a distance of 10 ft below the dam's toe. This will discourage scour.

The dam was built in two stages to facilitate stream control. A cofferdam was erected out from the west bank and a diversion channel excavated outside of the cofferdam. Space inside the dam was unwatered and about half of the dam built in the dry. The contractor incorporated a diaphragm wall into the structure parallel to the stream channel as additional protection from flood waters. When this part of the structure was complete, the stream was turned into the box culvert and the other half of the stream bed unwatered so that the remainder of the dam could be built in the dry.

A galvanized steel trash rack is provided at the tunnel inlet to screen out leaves and debris.

• **Cost and credits**—The temporary diversion dam cost about $175,000.00. To be effective about 3 years, it was expected to be in use for 10-15 years—or until such time that the high Liberty Dam was built. However, because present water consumption of the city is greatly in excess of the safe yield of the Gunpowder Falls supply, it was decided that construction of Liberty Dam should be undertaken at once. This will reduce time that the diversion dam will be in service.

It was designed by Baltimore's Bureau of Water Supply, a division of the Department of Public Works. Leon Small is water engineer; J. M. Kinniar prepared the engineering design.

Contractor for the project was S. R. Rosoff, Ltd., M. L. MacLean being chief engineer. General foreman was Henry Halloway.

B. L. Werner, principal associate engineer, represented the Bureau of Water Supply on actual construction.

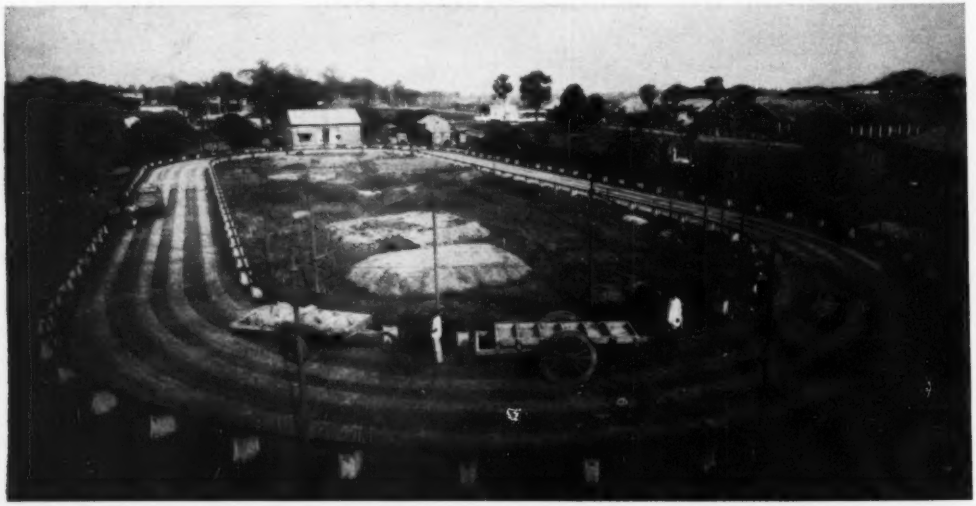
India studies road materials

A unique test track has been in use in India since 1939 for study of road surfacing materials. It is located at the Indian government's Alipore test station at Calcutta.

The track is oval in shape, 614 ft long and 16 ft wide. Because of the poor soil conditions of the area, a permanent foundation of brick, 14 in. thick was put down, as base for types of road surfacing materials.

The test road was designed primarily to determine the effect of bullock carts on road surfaces, but instead of using bullocks, the track is equipped with 10-hp electric tractors mounted to run on a single elevated rail on each side of the track. These tractors are designed to reproduce all the peculiarities of motion characteristics of the carts in actual use on highways in India.

Various types of stone and binders have been tested to date, also a wide variety of bituminous binders and surfacing materials and type of soil stabilizers. Comparisons of the effect of loaded steel tires and pneumatic tires on test surfaces under heavy rain conditions also have been made. The pneumatic tires did more damage than steel tires. Comparison of steel tires showed that the wear under a 2-in. wide tire is practically double that of tires 3½, 4 and 5 in. wide. On the other hand, the 3½ in. tires produced no more wear than the 4 or 5 in. tire, indicating a maximum width beyond which wear does not vary appreciably.



BULLOCK CARTS being tested in India to determine their effect on various types of road surfacing materials. Monorail tractors are used instead of bullocks on the test track.

East Fisher Street - Built in 1941

East Francis Street - Built in 1948

North Charles Street - Built in 1949

North Sumner Street - Built in 1950

Pampa, Tex. goes "*all out*" for *SOIL-CEMENT* streets after they prove their economy and durability

IN 1941 Pampa, Tex. built 8 blocks of soil-cement* streets. Till 1948 no maintenance was necessary. Then a new single course bituminous surface was applied at a cost of 12½ cents per sq. yd. This has been the entire cost of maintaining the pavement.

This record of economy and durability convinced Pampa there was only one way to go in its postwar paving program—soil-cement. Six of 28 blocks paved in 1948 were completed too late for surfacing that year. For 10 months they were open to traffic without any surfacing at temperatures ranging from below zero to above 100. Yet all that was required to prepare the soil cement base for surfacing was cleaning, using a broom drag.

Now Pampa has 175,807 sq. yd. of soil-cement streets. Says City Engineer Ray Evans: "We feel citizens of Pampa are enjoying 110 blocks of excellent paving with maintenance costs at a bare minimum.

"The City Commission realizes that future soil-cement paving will not increase street maintenance cost to an extent that would throw an overburden on the city's finances. Therefore, it is advocating as much pavement construction each year as can be accomplished by its construction forces."

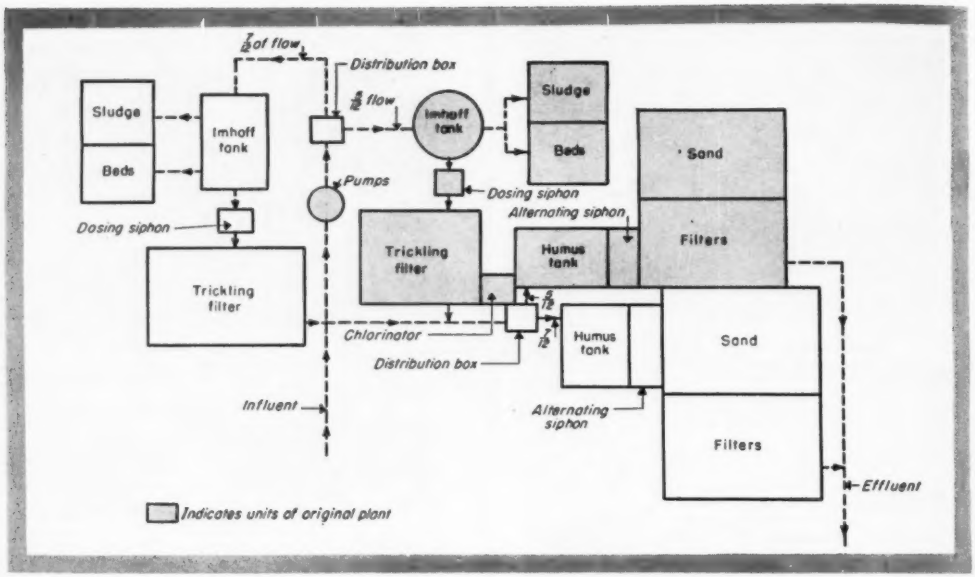
Like Pampa, cities, counties and states all over America enjoy economical, all-weather service from soil-cement roads and streets. Soil-cement pavement is economical because most of the required material usually is soil on the site and construction procedures are fast and simple. Records prove that maintenance costs are extremely low. Write for free literature, distributed only in U. S. and Canada.

*Soil-cement pavement consists of soil-cement base and bituminous surface.

PORTLAND CEMENT ASSOCIATION

DEPT. A3a-17, 33 WEST GRAND AVENUE, CHICAGO 10, ILLINOIS

A national organization to improve and extend the uses of portland cement and concrete through scientific research and engineering field work



TREATMENT for housing development is by settling in Imhoff tanks, trickling filtration, chlorination, final settling in humus tank and effluent "polishing" on sand filters. Sludge dries on open beds. Plant capacity is more than doubled by expansion.

A realty company takes responsibility: It builds and operates a sewage plant

SEWAGE DISPOSAL—or lack of it—for suburban real-estate development is a growing headache for state officials in public health work. Main reason is that most of the new colonies are beyound control of municipal regulatory laws, and wastes are often discharged with stealth and irresponsibility.

Real-estate developers – operating outside of the city limits–always make sure that their houses are served with the most obvious facilities. Street pavements, running water and sewer service are musts that the developer has to provide to ring up sales. Prospective buyers just aren't interested if these items are not available.

But there the responsibility seems to end. The sewers are apt to lead to the nearest streams or open ditch. Sometimes individual septic tanks are built without adequate subsurface drainage. And in no time, the newly settled families find that they have a waste problem in their back yard. Often they wake up to danger when a child falls ill due to exposure to human wastes. Odors from accumulating solids also mar their new-home pleasure.

The Brown & Vaughn Development Co. is an outstanding exception to this bleak situation. Operating in western Pennsylvania, this organization has provided complete sewage disposal for its Longvue Acres project, north of Pittsburgh. Longvue Acres, just off north-south route 19, is located in McCandless Township, Allegheny County, Pa.

And the company is going to include sewage disposal in future housing developments.

• **Management**–When the development was started, Brown and Vaughn executives approached township officials. They offered to construct a sewage plant for the proposed housing project at the company's expense; the plant to be turned over to the township for ownership and operation on completion. The town flatly rejected this offer.

The rejection forced organization of the Longvue Disposal Corp. which was set up to own and manage the sewage-disposal facilities. The Public Utilities Commission of Pennsylvania approved its application for the right to operate as well as the schedule of service charges.

Property owners pay the service rates established by the PUC, on quarterly billing. The minimum charge is $7.50 per year for any one service connection. Other charges are detailed in the table.

The existing 120,000 gpd plant was built in two parts: A 50,000 gpd, $32,000 original plant, paid for by the development company out of profits; and a 70,000-gpd expansion to the treatment facility, built for an additional $40,000.

• **The treatment plant**–The original plant was designed to serve 125 one-family houses. The expansion raises treatment capacity so that service is provided for 325 units completed last summer.

The original plant includes a circular Imhoff tank for separation of liquids and solids, a trickling filter for oxidation of the liquid, and chlorination in the humus or final settling tank. Sludge from the Imhoff tank is dried on open sand beds, with underdrains, connected to the trickling filter.

A further refinement in the treatment is passage of settled liquid through intermittent sand filters. Thus purified it is then discharged directly to Little Pine Creek, a tributary of the Allegheny River.

Dried sludge is taken off the beds with forks and loaded on trucks. It is sold (or given) to farmers in the vicinity for use as an agricultural fertilizer and soil conditioner.

The expansion, which increased plant capacity to 120,000 gpd, consists of a similar plant, exactly parallel in processing. The only exception is that the new Imhoff tank is rectangular in shape.

• **Owners and engineers**—The Brown & Vaughn Development Co. is managed by John Brown, T. M. Vaughn and Janet Haugh, who are also officers of the Disposal Corp.

Plans and specification of the treatment plant were prepared by J. Fred Triggs, a Pittsburgh consulting engineer. He also supervised construction.

Design for the Imhoff tank plant was approved by Pennsylvania's Department of Health. J. R. Hoffert is chief engineer.

THE DEVELOPMENT CORP. invested $72,000 in this sewage-treatment plant to take care of domestic wastes from 325 one-family houses.

SCHEDULE OF RATES FOR SEWER SERVICE

COMMERCIAL	Net Rate Per Annum Each Fixture
Automobile service stations, barber shops, beauty shops, clubs, fraternal organizations, restaurants, stores, theatres, offices, etc.	
Water closet	$7.50
Urinal	7.50
Hand basin	7.50
Shower bath	7.50
Drinking fountains	7.50
Floor drain (other than car wash) must have grease trap when required by company inspector	10.00
Car washing drain—must have grease trap	20.00
Shampoo basin	9.00
Soda fountains	9.00
Refrigerated cabinets- defrosting connection	1.80
Refrigerated cabinets-with water cooled compressor	20.00
Utility basin	7.50
Dental chair	7.50
Whirlpool equipment	3.00
Equipment for colonic irrigation	3.00
Dark room—small	3.00
Dark room—commercial photographer	15.00
Beer cooler	3.00
Beer drain	3.00
Under bar sinks	10.00
Garbage grinder	30.00
Kitchen sink	15.00
Steam table	3.00
Dish washer	15.00
Hotels—exclusive of restaurant, bar, cocktail lounge or tap room facilities; per room	3.50
No commercial property allowed to attach sewer for less than $7.50 rental per annum.	

RESIDENTIAL	Net Rate Per Annum First Fixture or Service	Additional Fixtures Each
Family service—includes one kitchen sink, one bath tub, with or without shower overhead, one toilet, one lavatory, one cellar drain, one garage drain, if integral	$18.00	
One kitchen sink, one water closet and one hand basin	15.00	
Kitchen sink	7.50	$4.50
Bath tub	7.50	4.50
Water closet	7.50	4.50
Hand basin	7.50	4.50
Laundry tubs, single or one pair	7.50	1.50
Shower bath—separate	7.50	3.00
Washing machine	7.50	1.50
Cellar or floor drain—in residence	.....	3.00
Cellar or floor drain—in private garage	7.50	1.20
Cellar or floor drain—in integral garage	.....	1.20
Shower bath—over tub	.....	3.00
Urinal	7.50	3.00
Dish washing machine	.....	1.20
Garbage grinder	.....	9.00
No residential property allowed to attach to sewer for less than $7.50 rental per annum.		

Mayari R members were used in this bridge at Eugene, Ore. Bridge designed by Oregon State Highway Commission; Fabricated by Poole, McGonigle and Dick, of Portland; Erected by Tom Lillebo of Reedsport, Oregon.

MAYARI R SAVES WEIGHT
in Willamette River Bridge

The new through-truss bridge over the Willamette River at Eugene, Ore., is a 442-ft continuous structure built largely of Mayari R.

All truss members and their connecting splices and gussets, all stringers and their splices, and all floor beams and pins in the bridge are made of this low-alloy, high-strength steel.

The use of Mayari R allowed a deadweight reduction as high as 33⅓ pct in some of the tension members, and a somewhat smaller reduction in the weight of the compression members. This, of course, effected considerable savings in material as well as in shipping costs.

Structural applications of Mayari R have increased substantially in recent years. Besides bridges, a variety of welded penstocks, large gas lines, canal lock gates, coal storage silos, and miscellaneous industrial structures have been built at a savings with this versatile steel.

If you would like more information, including properties and suggested design stresses for Mayari R, write to any of our sales offices for Catalog 259.

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BETHLEHEM STEEL

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New idea for prestressing concrete:

Apply prestress with glass

ENGINEERS all over the world are now well aware of the many benefits of prestressed concrete. But in many countries, they cannot take advantage of this material because of the lack of high-strength steel for prestressing. In these—as well as in other parts of the world—engineers may find substitution of glass cords or strands for steel well worth while.

This is the suggestion of Ivan A. Rubinsky, associate professor of engineering and physics at the American University, Beirut, Lebanon. He is at present in the United States on a visit, with headquarters at Near East College Assn., Room 1209, 46 Cedar St., New York 6, N. Y.

• **Glass is superior**—Professor Rubinsky points out that the raw materials for making glass—pure silica sand or borosilicates—can be found practically anywhere and in unlimited quantities. Manufacturing processes are available for forming glass fibers, which can be made into cords or strands. And only a small quantity of this material is required relative to steel—for a prestressed beam, perhaps one to two percent of the weight of ordinary reinforcing steel in an equivalent reinforced concrete beam.

Glass fibers have practically no plasticity. They retain their elastic properties until they break. Thus, residual strains are nearly non-existent.

Other advantages of this material, according to Professor Rubinsky, are high resistance to acids and alkalies and ability to withstand high temperatures. Thus, concrete prestressed with glass fibers would be more fireproof than ordinary reinforced concrete and immune to the corrosive action of sea water and many chemicals.

Furthermore, the professor says, the low modulus of elasticity of glass cords (about 6,000,000 psi) is an advantage. With prestressed concrete, the lower the modulus of elasticity of the prestressing element, the smaller will be loss of prestress due to shrinkage, temperature change and plastic flow of concrete.

• **High strengths reported**—It is a well established fact that glass fibers have great tensile strength. Professor Rubinsky notes that strengths as high as 5,200,000 psi have been reported for silica fibers 0.00012 in. in diameter. He expects, however, due to uneven distribution of stress, the strength of cords made of such fibers will be considerably less than the sum of the strengths of individual fibers. Nevertheless, ultimate strength values above 1,000,000 psi can be anticipated. Hence, the amount of glass fiber required for prestressing is about one-fourth the volume of 225,000-psi cold-drawn steel wire, and one-fourteenth the weight.

The problem of introducing glass into prestressed concrete construction, however, is not simple. One complication is that tensile strength of glass fibers decreases with increasing diameter. Also, the effect of irregularities and cracks must be taken into account.

These defects may explain the variation in strength with diameter: The smaller the fiber, the smaller the number of irregularities, and hence, the greater the possibility of a higher average ultimate stress. It is also possible to suppose that when a fiber is formed, defects are elongated parallel to the axis of the fiber. The finer the fiber, then, the more elongated the defects. This elongation of defects, especially of those on the surface, may reduce local stresses and so increase ultimate strength.

Another physical property affecting the use of glass fiber in prestressed concrete is the difference in strength between dry fibers and wet ones. Experiments have shown that strength may increase 2.5 to 4 times in a vacuum; that is, when absorbed moisture is completely eliminated. One explanation for failures at relatively low values in humid atmospheres is that surface cracks and defects in the fibers are filled with silica gels. These swell when exposed to humidity, setting up internal stresses and decreasing the strength of the fibers.

Another problem that designers of glass-fiber prestressed concrete would encounter is that of obtaining equal distribution of stress among fibers of a strand or cord. Experiments have shown that the strength of a glass strand may be over 50% less than the sum of the strengths of the individual fibers. It is quite possible, Professor Rubinsky says, this loss is due to lack of plasticity of glass. It is thus important to develop a type of strand or cord that would have a high effective strength.

Just as essential is the necessity for finding the proper size of cords to be used.

• **Glass in unbonded prestress**—Glass fibers can be used to apply prestress through bond or through end anchorages without bond. In the latter case, Professor Rubinsky suggests forming the member with longitudinal grooves into which glass cords will be placed. Continuous around the member, the grooves should be so shaped as not to have any sudden change in curvature, to avoid overstressing cords at sharp corners. Minimum allowable radius of curvature would be determined by strength of concrete, working stresses in the cords and cord diameter.

To apply the prestress, one end of the cord should be anchored to the concrete. Then the cord should be wound into a continuous groove under calculated tension. Finally, the second end should be anchored to the concrete.

A word of caution is necessary, however. As the cord is wound around the groove, the member deforms, the amount of compressive strain increasing as successive layers of cord are applied. This tends to decrease the stress in the layers placed first. Fortunately, as Professor Rubinsky points out, the modulus of elasticity of glass cord is small, so that the loss of stress is almost negligible and can be easily taken into account in design calculations, if desired.

For countries that import steel or do not have sufficient quantities of it, replacement of steel by glass offers tremendous economies, Professor Rubinsky concludes. Especially since natural supplies of silica for making glass are available practically everywhere.

PROF. I. A. RUBINSKY, of the American University, Beirut, Lebanon, now visiting the U. S., calls attention to the extremely high strength of glass fibers.

Piles go down, down, down—double quick—under the powerful, positive impact of Super-Vulcan. Delivering twice as many blows per minute, it rams piles through dense soil while using 25 to 35 per cent less steam. At the same time, Super-Vulcan's low-velocity impact keeps pile heads damage-free.

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READER COMMENT

Large bomb shelters

Sir: Your editorial "Why Build Large Bomb Shelters" in the Jan. 18 issue is exactly in line with the thinking of a considerable number of architects here in Boston. Under date of Jan. 12 a group made up of William T. Aldrich, G. Houston Burr, H. Deland Chandler, Wm. Roger Greeley and the writer sent a letter to the Boston newspapers in which we called attention to the evidence that planners in New York appear to be going on the assumption that New York's protective measures against air attack should follow the pattern developed for London. To us, that appears to be a false assumption.

On that point our letter said: "We are thousands of miles from our enemy. He is not likely to carry mere blockbusters across the pole. He has few (if any) A Bombs and few planes capable of delivering them. But those planes are fast, they fly very high, and the length of any effective radar screen we might establish would be very great. Hence, the probability of aerial attacks, particularly of multiple or repeated attacks at any given time, is greatly reduced, but so are our chances of getting a reasonable warning.

"What then is our problem of defense? It seems to us it is this—the development of a multitude of shelters, capable of being reached in perhaps a maximum of eight minutes, for brief occupancy during the explosion of a single bomb, and probably never used again. This is fundamentally different from the situation faced in London where people lived night after night in the deep shelters.

"People will need to reach some practicable shelter very quickly; therefore, there must be a great many of them. If a bomb explodes in the area, we are told to stay in the shelter for a relatively short time to escape the most intense radiation, and then to get out of the affected area as quickly as possible.

"If this analysis is correct, a few elaborate deep shelters are futile. Existing subways can be used by people on the street able to reach entrances quickly. Buildings of sound first class construction should provide their own shelters for their occupants, who probably couldn't all get out of any large building in eight minutes, to say nothing of getting into some more or less distant shelter. Persons in unsafe buildings should have some near-by, well-marked shelter, known in advance, with a method of access rehearsed so it can be reached if possible in the few minutes that are apt to be available."

A day or two after we sent the letter the GLOBE referred to the editorial that was to appear in the Jan. 18 issue of ENR. On Jan. 18 it printed our letter, and on the 19th the HERALD printed it with editorial comment, referring also to your editorial.

WILLIAM STANLEY PARKER
Architect,
Boston, Mass.

More on higher steel stresses

Sir: I have read with great interest the letter from Mr. Van Rensselaer P. Saxe (ENR Nov. 16, 1950, page 48) advocating raising the unit tension stress for structural steel from 20,000 psi to 24,000 psi.

I am in complete agreement with this suggestion as testified by the fact that I ordered my design staff to use the higher stress the day after the Korean invasion. A substantial saving for my company, the California Packing Corp., largest packers and canners in the world, has already resulted.

However, this increase does pose some interesting problems. One is the 20% boost in unit stress allowed for fully continuous beams and girders over interior supports as outlined in Part III of the AISC specifications. This stress would logically jump to 28,800 psi and should be close enough to the elastic limit to please Mr. Saxe. Incidentally, I have found that this negative moment stress governs in a great many structures.

Another steel saving can be made by designing the beam and floor slab as a composite section. In this respect Sec. 2623 of the Uniform Building Code of the Pacific Coast Building Officials Conference should be revised and brought in line with bridge design practice.

Roof snow loads should be carefully re-examined with a view to reducing the required section modulus. The tendency is to assume too heavy a load. Reasoning behind such reexamination was detailed in an article entitled "Snow Loads on Buildings" by Vern Ketchum and James H. Cissel, ENR July 7, 1949, p 76.

In Alaska, where I have heard rumors of considerable building activity, we have found that a 100-mile wind governs the design rather than snow load. The wind blows the snow away and the unit stress can be raised a third to take care of the wind. This has resulted in an appreciable saving in steel.

M. C. CONKEY
Chief Structural Engineer
California Packing Corp.

MUNICIPAL AFFAIRS

BUFFALO'S WATERFRONT on Lake Erie and the Niagara River is the site of much present and prospective development, including an $8,000,000 high-level bridge to span waterways and railroad tracks in this busy western New York metropolis.

Buffalo booms with defense orders

Buffalo, N. Y., population 577,393, heart of the booming Niagara Frontier industrial region, is plunging into another all-out defense production program, assuming once again the role that marked the city as one of the nation's leading arsenals during World War II.

Millions of dollars of defense contracts are pouring into the Buffalo area and the district's huge steel mills, aircraft plants, foundries, machine shops and chemical factories are pushing operations to peak levels.

Postwar industrial expansion in Buffalo and environs has been substantial. Bethlehem Steel is putting more than $100,000,000 into its huge works in nearby Lackawanna, and Ford Motor Co. has just completed a $35,000,000 stamping plant in the same area.

Big producers of aircraft and aircraft parts, such as Bell Aircraft, Twin Coach and Chevrolet, are adding rapidly to their plant facilities, reactivating a number of huge plants that have been idle since the close of World War II. Scores of smaller plants are seeking additional facilities to handle their rapidly rising order backlogs.

Expansion of the Buffalo metropolitan area is continuing rapidly along with this big industrial development. Thousands of new homes have been erected in the suburbs where is the biggest increase in population.

Meanwhile, a number of long-needed and vital public works projects have been launched which will do much to improve traffic conditions throughout the Buffalo area as well as enhance appearance of the waterfront.

Of prime importance is the new $8,000,000 high level bridge which will span waterways and railroad tracks in the waterfront district and provide quick access to downtown Buffalo for traffic coming in from the west. Preliminary work on the bridge is under way and it is hoped that it can be completed by 1953.

Also of major interest is the long-sought Terrace railroad track removal program in the downtown area which will provide a major track relocation, improve the appearance of the area and eliminate traffic bottlenecks. This is a $6,000,000 project which is now well under way and scheduled for completion in 1952.

Also launched recently was a $2,000,000 underpass project at Humboldt Parkway and Main Street, a principal traffic intersection, aimed for completion by December of this year. Recently completed was a $1,000,000 widening of Hamburg Turnpike leading into Buffalo along the Lake Shore.

Finally, there is from $40,000,000 to $50,000,000 worth of road construction in blueprint form planned for the Buffalo area as part of the New York State Thruway and arterial roads program. A small start on this huge program has been made and the

(Continued on page 48)

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project will extend over a period of many years.

All of these public works projects are being constructed under the New York State Department of Public Works.

Also under construction or in the planning stage are a large number of institutional projects, including hospitals and schools.

At Niagara Falls, not far away, plans are under way for a huge increase in hydro-electric power development in which both the U.S. and Canadian governments are participating. Cost of this project will run into many millions of dollars and will provide upstate New York with a large new source of electric power.

Before the State Legislature is a proposal to establish a Buffalo Port Authority which would have a long-range program of developing and rehabilitating the city's waterfront, expanding airport facilities and providing new parking facilities in the downtown section.

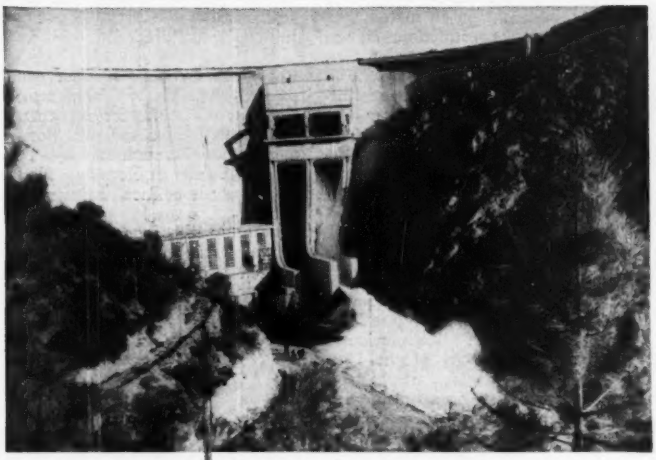
The Port Authority program calls for an initial expenditure of $15,361,500 and an eventual outlay of $45,874,500.

Call to military service hits city employees

In a recent survey by the Civil Service Assembly it was found that approximately 10 to 15 percent of public employees were subject to call for the military service. Almost without exception, the greater losses would occur in the fire and police departments. In Jefferson County, Ala., for example, about 150 of the 900 employees in the fire and police departments were found to be members of the National Guard or reserve component. In Phoenix, Ariz., about 10 percent—129—of the total personnel of the city is eligible for military service. The department of public works would be the hardest hit with 41 to go, while the police and fire departments each have 34 employees who might be called to active duty. Since the Korean conflict began, 15 employees of San Diego, Cal., have entered military service. From the remaining total of 2,870, 7 percent are in the reserves, less than 1 percent are National Guardsmen and about 3 percent are subject to the draft.

Fluoridation recommended—Fluoridation of Chicago's water has been urged by the Chicago Dental Society in a letter from its president, Dr. Arno L. Brett, to Dr. Herman N. Bundesen, president of the Board of Health. Fluorides are urgently needed because 75 percent of the city's children have dental decay, according to Dr. Brett.

DEVELOPMENTS ABROAD



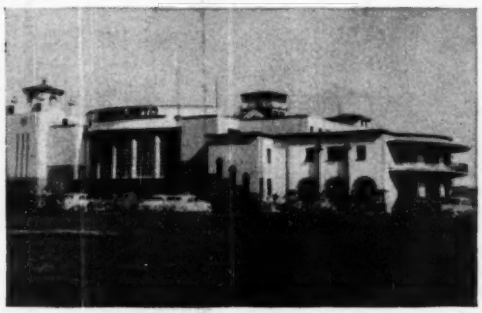
ZEZERE RIVER DAM COMPLETED—The Zezere Dam and generating plant at Castelo Do Bode, 90 miles north of Lisbon (ENR Oct. 20, '49, p. 48), were opened Jan. 21 by President Oscar Carmona of Portugal. Construction was done by a British firm. It is an arch-type concrete dam, with a maximum height of 377 ft. Its reservoir will store 867,500 ac ft of water. The spillway was designed for a discharge of 145,000 cfs. Flow through each of two large openings is regulated by sector pivot gates. Three other dams will be built on the Zezere River, a tributary of the Tagus. Castel do Bodo's firm annual generation is to be 380 million kwh yearly, with the other three plants adding 320 million kwh more annually.—Wide World Photo

Foreign Briefs

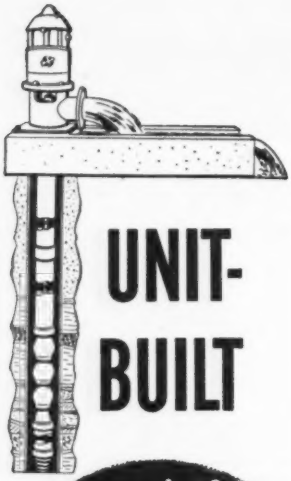
French steel for defense—France's rearmament program will be aided by two Marshall Plan projects designed to increase French steel plate production, and the increased production will also enable France to export larger quantities of steel plate to other Atlantic Pact nations which need it for their mutual defense rearmament programs. The projects provide for modernization and expansion of a plate and slab mill at Dilligen in the Saar, owned by Soc. Anonyme des Forges et Acieries de Dilling, and a plate mill at Mont-Saint-Martin, owned by Acieries de Longwy. The total cost of the two projects is estimated at the equivalent of $14,640,000, of which about one-third will be financed with Marshall Plan dollars. The ECA dollars, amounting to $4,560,000, will pay for equipment for the two mills to be purchased in the United States and for technical services involved in supplying the equipment for the Longwy plant.

To modernize Spanish roads—The government of Spain has approved plans for modernizing its road system, the work to be carried out in two stages—a total of 6,875 miles of main highways first and about the same length of secondary roads for the second stage. The work is expected to take five years.

Help for Indonesia—Credits aggregating $52,245,500 have been granted by the Export-Import Bank of Washington to the Republic of Indonesia. The credits will be used to finance the importation of productive equipment and materials for reconstruction and development. The allocations include $20,000,000 for automotive equipment; $2,100,000 for road building equipment; $6,700,000 for dredges and for steel, cement and other materials for rebuilding port facilities; $17,100,000 for railway and track-laying equipment; and $6,085,500 for eight airplanes. The Economic Cooperation Administration on Jan. 26 allotted $700,000 in United States aid funds to Indonesia to cover initial costs of consulting, advisory and engineering services to be performed by the J. C. White Engineering Corp., of New York. This is the latest in a series of U. S. aid projects which are being launched to assist the Indonesian government in its efforts to restore and advance the public health services, aid the small rubber planters, develop forest resources, restore the fishing industry, stimulate agriculture and support small industries.



CENTRAL AMERICAN AIRPORTS—Two Central American countries have opened modern airport terminal buildings designed for efficiency and passenger comfort. El Salvador, left, has built a $3,000,000 terminal building at its Ilopango airport outside of the capital city. Built of brick and masonry, the building is part of a twin bid by Salvadorians to get the main Pan-American base in Central America moved from Guatemala, where there has been some political trouble, to El Salvador. The other portion of the bid is a $3,000,000 hotel, completely air-conditioned with 250 rooms, swimming pool and night club. The Honduras building, right, is at Toncontin Airfield outside the capital city of Tegucigalpa. As Honduras is practically without communications between its major cities, the airport is an essential part of the country's economy.



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MEN AND JOBS

Michael E. Kalette has been appointed special consultant on all matters pertaining to Army construction. He was with James Stewart & Co. of New York from 1920 to 1949, latterly as president. He will act as liaison between the Army's construction divisions and those of other agencies of the Department of Defense, other government departments, and the construction industry.

Philip J. Clark, city engineer at Tipton, Ind., has resigned.

Henry R. Berg, the civil engineer of Seattle, Wash., has been appointed civil defense co-ordinator by the local civil defense board. He previously was executive secretary of the City Planning Commission, after many years on the staff of the city engineering department and wartime service with the Army Engineers.

W. E. Swan, Munising, Mich., has been appointed city engineer of Ishpeming. A sewer diversion project will be first to demand Mr. Swan's attention.

Lieut. Col. Gilbert R. Frith has been assigned to Atlanta, Ga., as sanitary engineer with the Third Army Medical Section. He was associate director of Water Pollution Control, Georgia Department of Public Health, Atlanta. He served overseas in the China-Burma-India Theater during World War II, and in May and June of last year was with the Alaska Insect Control Research Project.

Robert O. Grimes has been named project engineer by Farnsworth & Chambers Co., Inc., for the construction of the M. D. Anderson Hospital for Cancer Research at the Texas Medical Center in Houston. He is a C.E. graduate of Rice Institute.

Cecil D. Wight, former commissioner of works and recently a member of the Ontario Municipal Board, has been appointed Director of Planning and Development of Ottawa, Ont.

Van Rensselaer P. Saxe, has withdrawn from Saxe, Williar, & Robertson, of Baltimore, Md., and is continuing his private practice at 100 West Monument Street, Baltimore 1.

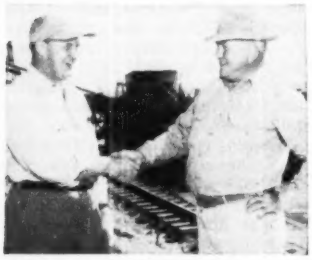
James P. Slater, Tulsa, Okla., city-county sanitary engineer for the last two years, has gone to San Diego, Calif., to accept a similar post with the health department there.

Honolulu's engineer-mayor, **John H. Wilson**, 79, started his sixth term at the head of the city government this year by reappointing **Karl A. Sinclair** as city engineer, and making **Arthur Akinaka, Jr.,** Honolulu contractor, superintendent of buildings to succeed **Lyman Bigelow**, retired.

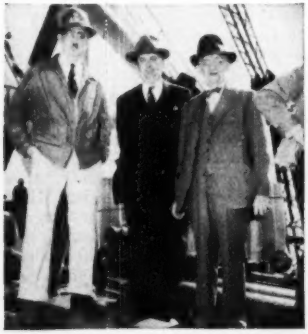
R. G. Johnston, general manager of the Canadian Construction Association, Ottawa, is now on temporary leave to assist the Canadian Commercial Corporation (federal government purchasing and contracting agency) with all aspects of defense construction contracts. S. D. C. Chutter, assistant manager, is carrying on the work of the C.C.A.—Capital Press Service photo.

Assistant Regional Forester Fred Theime has retired after 39 years in government work in the northern region. He holds engineering and forestry degrees from the University of Montana. In 1912 he directed topographic survey crews in the Cabinet and Kaniksu forests. In 1921 he was promoted to assistant regional forester as chief of all engineering work for the northern region.

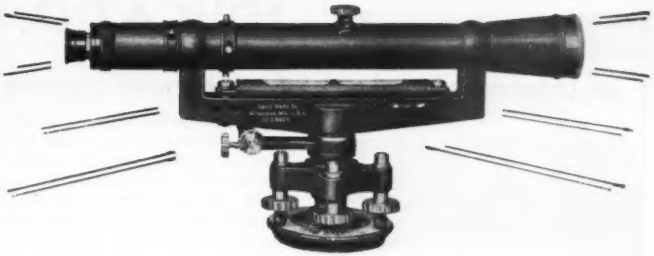
As general superintendent, Russ Hoffman directs work for Consolidated Builders, Inc., on their $28,000,000 contract with the Corps of Engineers for construction of the 1,500,000-cu yd Detroit Dam, Ore.



Robert K. Ames, left, project manager for Western Contracting Corp. and John J. Welsh, chief inspector for the Bureau of Reclamation, exchange congratulations as concrete-lining operations are completed on a 17-mile section of the Delta-Mendota Canal between Newman and Volta, Calif. Work is done for 89 miles south of Tracy Pumping Plant.



When the first 518-ft span of the 61-year old Illinois Central Railroad bridge at Cairo, Ill., was rolled out of the way and dumped into the Ohio River and a new span rolled into its place (ENR Nov. 23, 1950, p. 23), these top flight engineers were on hand to supervise operations. They are W. B. Hunter, contracting manager, American Bridge Co., contractors on the job; C. H. Mottier, vice-president and chief engineer of the ICRR (center); and F. M. Masters ,of Modjeski and Masters, consultants on the $6,300,000 project.



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EDUCATION and RESEARCH

Some new courses offered

Disaster preparedness—For inspectors of the N. Y. City health department, a special one-week course on disaster preparedness was given recently at the department of civil engineering of the college of engineering, N. Y. University. Some subjects covered were: Types of disasters in peace and war, the municipal health agency responsibility, the New York civilian defense organization, pre-emergency planning, the water supply system, the sewerage system, the milk and food supply, emergency measures for providing safe water, milk and food, problems created by radioactive material, methods of de-contamination, locating essential water, sewage, milk and food facilities, mapping of critical points, preparation for emergency distribution of water, milk and food, emergency disposal of human waste, garbage and refuse, emergency measures for control of rodents and insects, and for shelter and sanitation, evacuation planning, distribution of staff responsibilities, the communication system, and coordination of health department activities with those of other agencies.

Regional planning—An undergraduate course in regional planning has been given for 18 years by the Department of Landscape Architecture at the University of Illinois. It has been under the direction of Karl B. Lohmann, professor of city and regional planning.

Evening courses—At the College of the City of New York 21 evening courses in technical and building construction will be offered to the general public this spring. Building construction courses will cover materials, plan reading and estimating, structural design, architectural drawing, applied construction design, use of surveying instruments, heating and ventilating, construction and superintendence.

Architects and contractors in Utica, N. Y., have pledged cooperation with Utica College in the formation of a new two-four year course in contracting and light building construction. The advisory committee will be expanded to include representatives of the local building trades council and the builders' exchange.

Building inspectors—At Purdue University, West Lafayette, Ind., a short school for building inspectors is being conducted under the sponsorship of the schools of engineering, the Technical Extension Division and the Midwest conference of building officials and inspectors.

For professional licenses—At Watertown, N. Y., 25 engineers in the district office of the N. Y. State Department of Public Works will be given intensive courses in evening classes at the new Watertown high school. There will be specialized instruction to the class, which is preparing to take state examinations for the professional engineer's license in June.

Rat-borne diseases—A semi-annual field training course in rat-borne disease prevention and control will be held by the Communicable Disease Center, P.H.S., in Atlanta, Ga., March 12-30. A new manual will be used for the course, and there will be a new joint Army-Public Health Service series of motion pictures on rat control.

Evening graduate work—The School of Technology, College of the City of New York, for the spring term is offering these civil engineering courses: Advanced Fluid Mechanics, Hydraulic Structures, Advanced Indeterminate Structures, Advanced Structural Design, Advanced Soil Mechanics, and Engineering in Public Works.

Faculty News

Illinois—Robert LeRicolais, French structural engineer and developer of the three-dimensional polyhedral system of framing for industrial buildings, will be a visiting professor of building structures at the University of Illinois for the second half of this academic year.

Dayton—Brother Louis A. Saletel, S. M., has been appointed acting dean of the college of engineering at the University of Dayton, Ohio, serving in the post held by Brother J. Albert Wehrle, on leave. Brother Saletel announced his immediate objective will be national accreditation for three of the four schools in the college—those of civil, mechanical, and electrical engineering.

Stanford—Jaroslav J. Polivka, Czechoslovakian consulting engineer, has been appointed a lecturer in architecture at Stanford University. In Europe, Dr. Polivka had been an engineer on such projects as the Podolsko Bridge, longest concrete span in Central Europe, and navigation locks in Bohemia. He is a graduate of the Technical University of Prague. He came to the United States in 1938 and until 1942 was a research associate in civil engineering, University of California.

MEETINGS

Vern W. Johnson, managing partner in the Spokane, Wash., firm of Busboom & Rauh, has been elected president of the Eastern Washington Builders' chapter of the A.G.C. J. L. Hazen of Hazen & Clark, Spokane, was elected vice president while the following were named to the executive board; Harry M. Robles, Gus J. Bouten Construction Co., Spokane; Marvin Cherf, Cherf Bros. Construction Co., Ephrata; and Henry George, Henry George & Sons, Spokane.

Francis Butler, Grand Forks, was elected president of the North Dakota Contractors Association. He succeeds William Collins, Jr. of Fargo. John L. McCormick, Sr., Fargo, was chosen vice-president and Jesse Blewett, Jamestown, was reelected secretary-treasurer.

R. Marrett Wheeler, assistant general manager and chief engineer of the Interstate Construction Co., Charlotte, N. C., was elected president of the Charlotte Engineers Club. G. S. Reed, vice-president of Duke Power Co., was made vice-president; Glen A. Coan and John L. Rosenblatt were reelected secretary and treasurer, respectively.

Howard Lease of the Lease & Leigland Construction Co. has been elected president of the Seattle, Wash., chapter, A. G. C., with W. D. Brown of Howard S. Wright & Co. as first and Elmer Edwards of the Manson Construction & Engineering Co. as second vice-president. Paul Odegard of the Odegard Construction Co., Everett, was named secretary and P. D. Koon of the Olav Boen Construction Co. as treasurer. Named to the executive board were W. G. Clark, O. B. Daniels and Cliff Mortensen.

The Texas Construction Council has elected: Chas. H. Oehler, city commissioner of Galveston, president; C. O. Chromaster, Ft. Worth, is new vice-president and Uel Stephens, water superintendent of Ft. Worth was reelected secretary.

H. Walter Hughes, associate engineer of the city public works department of Rochester, N. Y., has been elected president of the Upstate Chapter of the American Public Works Association. Other officers: Fred W. Crane, commissioner of public works in Buffalo, vice-president; Eldred H. Walker, Rochester structural engineer, secretary-treasurer. John Szumilosky of Schenectady and Herbert Walker of Jamestown are directors.

Arthur A. Batts, former president and chairman of the board of the Carborundum Co., has been named chairman of the Northwestern New York Water Authority, to set up to develop additional water supplies for five Western New York counties. Other members are A. Willard Densmore, Albion, vice-chairman; John Shaw, Newfane, treasurer, and Herbert Rapp, former assemblyman of Darien Center, Genesee County. The authority, authorized by the 1950 Legislature, was created to put into effect a program of expansion of water supplies for Niagara, Orleans, Monroe, Genesee and Wayne counties, using the west branch of the Niagara River as one of the main sources.

The Metropolitan New York Codes Committee of the New York State Society of Professional Engineers has elected Ralph M. Kendall chairman. The committee represents the N. Y. City chapters of the New York State Society of Professional Engineers with respect to proposed changes in the New York City building code, the multiple dwelling law and other laws relating to the safety of buildings in the metropolitan area.

Officers of the Detroit chapter of AGC are: President, Charles H. Richert; -first vice-president, A. S. James; 2nd vice-president, John Cooley, and treasurer, G. K. Chapman.

CALENDAR

American Society for Testing Materials, spring meeting. Netherland-Plaza Hotel, Cincinnati, Ohio, week of March 5.
American Road Builders Association, Schroeder Hotel, Milwaukee, Wis., March 12-14.
American Railway Engineering Association, Chicago, Ill., March 13-15.
N. J. Sewage and Industrial Wastes Association, Haddon Hall Hotel, Atlantic City, N. J., March 14-16.
Structural Engineering Conference, University of Florida, Gainesville, Fla., March 16-17.
National Housing Policy Conference, Jefferson Hotel, St. Louis, Mo., March 19-20.
Illinois Section, A.W.W.A., LaSalle Hotel, Chicago, Ill., March 28-30.
N. Y. State Association of Highway Engineers, Rochester, N. Y., March 28-30.
New York Section, A.W.W.A., Hotel Ten Eyck, Albany, N. Y., April 5-6.
N. J. Society of Professional Engineers Haddon Hall, Atlantic City, N. J., April 6-7.
Concrete Reinforcing Steel Institute annual meeting, The Homestead, Hot Spring, Va., April 16-21.
American Water Works Association, annual conference, Miami, Fla., April 29-May 4.
Materials Handling Exposition and Conference, International Amphitheater, Chicago, Ill., April 30-May 4.
California Section, American Society of Civil Engineers, The Ahwahee, Yosemite National Park, Calif., May 3-5.

it's DAREX *AEA* concrete!

FOR POWER . . .

In the construction of Southern California Edison Company's Big Creek hydroelectric project on the San Joaquin River, DAREX AEA concrete was used to improve plasticity, reduce bleeding and segregation.

One of four projects in Kansas' Verdigris River Valley, the Fall River dam was constructed with DAREX AEA concrete because of its better workability without the use of excess water.

FOR FLOOD CONTROL

DAREX *AEA* is the only catalyzed air entraining agent specifically formulated for making air entrained concrete.

DAREX *AEA* is in use everywhere on every type of concrete construction . . . and in ready mix and concrete products plants using every known type of aggregate.

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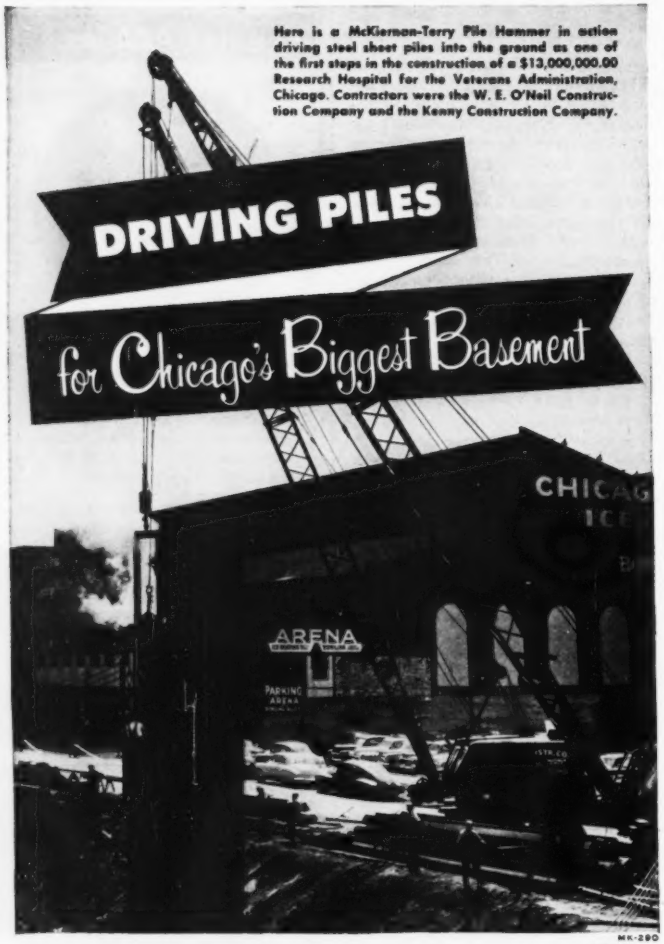

Here is a McKiernan-Terry Pile Hammer in action driving steel sheet piles into the ground as one of the first steps in the construction of a $13,000,000.00 Research Hospital for the Veterans Administration, Chicago. Contractors were the W. E. O'Neil Construction Company and the Kenny Construction Company.

Work on the largest basement ever dug in the city of Chicago was aided by two fast-driving McKiernan-Terry Double-Acting 9-B-3 Pile Hammers. These powerful hammers drove 30,000 feet of interlocking steel sheeting, up to 45 feet in length, around the entire excavation. This effectively helped keep the working area dry during construction • Whatever your pile driving problem, you will find the answer in the 15 sizes of single-acting and double-acting hammers and 2 sizes of double-acting extractors available in the complete McKiernan-Terry line. Write for bulletin.

GRAB BUCKETS

COAL TOWERS

TRANSFER BRIDGES

HONING TO 42" I. D.

McKIERNAN TERRY

McKIERNAN-TERRY CORPORATION • MANUFACTURING ENGINEERS
13 PARK ROW, NEW YORK 38, N. Y. *Plants: Harrison, N. J. and Dover, N. J.*

OBITUARY

Frank W. Allen, 83, retired civil engineer, died Feb. 10 in New Hartford, N. Y. He built or helped to build some important engineering projects in New York City. He was a C. E. graduate of Union College, and began his career in 1894 in New York, where he was engaged in the construction of several speedways and bridges. Later he was a contractor's engineer for Rodgers & Hagerty, as chief engineer for more than 24 years, and retired as vice-president.

Fred H. Loftus, 56, president of Loftus Engineering Corp., Pittsburgh, Pa., died Feb. 10. Before forming his company, he had served as chief engineer and director of the Open Hearth Steel Furnace Co., Chicago.

Thomas E. Brick, 72, formerly a civil engineer with the U.S. Bureau of Reclamation, active in western irrigation work, died in Indianapolis, Ind., Jan. 25.

John W. Price, 82, retired Attica, Ohio, surveyor, who had been with the Seneca County engineer's office for 25 years until a few years ago, died Jan. 31.

Eugene Comotis, 66, a general contractor of Buffalo, N. Y., died Feb. 10.

Eustace Senior Estlin, 85, pioneer western Canada civil engineer, died recently at Vancouver, B. C. As construction engineer, he designed and supervised construction of more than 400 grain elevators in the prairie provinces.

Charles W. Williams, 68, civil engineer in a number of pioneer British Columbia developments, died recently at Vancouver, B. C. He was first associated with the engineering firm of Cartwright and Matheson. Later, he worked on the surveys of the Pacific Great Eastern Railway route and in the Fraser Valley.

James Hall Watson, 90, pioneer civil and mining engineer of Seattle, Wash., died there Feb. 12. He was graduated from the University of Glasgow before moving to the United States in 1880 and to Seattle in 1884. He worked as a civil engineer on the first railroad to build a line into Seattle. Later he was first inspector of mines in the Territory of Washington and also a field engineer in Alaska for the Alaska Road Commission. He retired 20 years ago.

UNIT PRICES BID BY CONTRACTORS

Sewer intercepter for Pawtucket, R. I.

A bid of $410,263 was low of six bids received by Blackstone Valley Sewer District Commission, Providence, R. I., Jan. 10, 1951, for a sewer intercepter in Pawtucket. It was 8.6% below the second low and 18% below the high bid. Metcalf & Eddy of Boston, Mass., are consulting engineers.

The job is at the Taft Street-Pleasant Street Branch of the Pawtucket Sewer system and is half a mile from the railroad. It involves 680 feet of inverted siphon which includes 500 feet of subaqueous work in Seekonk River. The inverted siphon consists of one line of 48", one line of 30" precast concrete pipe and one line of 16" cast iron pipe; all laid in the same trench.

The work must be completed in 325 days. Wage rates are: common laborers, $1.60; semi-skilled workers, $1.95-$2.25.

Bidders were:

1 Gil Wyner Co., Inc., Malden, Mass. (Contract)	$410,263
2 Wes-Julian Construction Corp., Dedham, Mass.	445,731
6 Coleman Bros. Corp., Boston	687,138

Items	Quantity	Unit prices 1 C	2
Excav, earth, bkfill Seekonk			
Riv, east bank ..... ls	.....	$2,154	$5,250
In river ..... ls	.....	96,000	180,000
West bank ..... ls	.....	4,040	20,000
Add'l earth excav above nor grade subaqueous..cy	300	3.00	5.00
Unwatered tren ..... cy	100	3.00	5.00
Excav earth below nor grade, suba ..... cy	300	6.00	10.00
Unwatered tren ..... cy	100	6.00	10.00
Excav rock, suba ..... cy	3,000	40.00	15.00
Unwatered tren ..... cy	500	20.00	5.00
Gravel cradle, subaqueous ..... lf	500	22.50	30.00
Unwatered tren ..... lf	165	18.00	15.00
Gravel bkfill below nor grade, suba ..... cy	300	5.00	10.00
Unwatered tren ..... cy	100	4.00	5.00
Conc pipe, f, 48" typ A ..... lf	450	39.00	35.00
48" typ B ..... lf	240	39.00	35.00
30" typ C ..... lf	450	26.25	25.00
30" typ D ..... lf	240	26.25	25.00
Add'l cost, f, Mh for 48" sewr ..... ea	4	1,080	1,050
30" sewer ..... ea	4	863.00	780.00
Bend, 48" sewr ..... ea	5	517.00	450.00
30" sewer ..... ea	5	319.00	280.00
Closure sec, 48" sewer ea	1	565.00	480.00
30" sewer ..... ea	1	443.00	380.00
Joint, typ 111-A, 48" pipe ..... ea	9	820.00	770.00
Joint, typ 111-B, 30" pipe ..... ea	9	538.00	520.00
CI pipe, 16", f, flex joint..lf	530	29.40	30.00
Std B & S joint ..... lf	162	12.60	10.00
Add'l cost, f hatch box, 16" CI p ..... ea	4	900.00	600.00
Lay 48" pipe, suba ..... lf	430	30.00	25.00
Partly unwatr tr ..... lf	100	9.50	25.00
Unwatered tren ..... lf	160	9.50	15.00
Lay 30" pipe, suba ..... lf	430	30.00	20.00
Partly unwatr tr ..... lf	100	9.50	20.00
Unwatered tren ..... lf	160	9.50	12.50
Lay 16" flex jt CI p, subaqueous ..... lf	430	8.25	10.00
Partly unwatr tr ..... lf	100	4.50	10.00
Pipe, 16" B & S, 1, unwatered tren ..... lf	162	5.40	8.00

Items	Quantity	Unit prices 1 C	2
Cleanout chamber, east .. ls	.....	$12,425	$20,000
West ..... ls	.....	12,000	20,000
Loam, seed & grass ..... sy	500	1.50	1.00
Conc, add'l or red quantity, CI AA ..... cy	10	40.00	60.00
Class A ..... cy	50	40.00	50.00
Class B ..... cy	40	40.00	25.00
Rein conc, add'l or red quantity ..... lb	5,000	0.13	0.12
Add'l lumber left in place ..... Mfbm	1	184.00	200.00
Cleaning up ..... ls	.....	1,300	1,000

Bridge over Brandywine River, Delaware

Contract for a steel bridge across the Brandywine River, Del., was awarded by the State Highway Department, Dover, Del., on Feb. 7, 1951, on a low bid of $600,703.75. This was 5.6% below the next to low bid and 13.5% below the high.

Work includes construction of a 2-lane steel bridge across the river between Barley Mill Road on the west and New Bridge Road on the east at Wilmington. The bridge, 811 feet overall,, consists of a three span continuous structural steel plate girder 331 feet in length, flanked by six rolled stringer spans totaling 320 feet on the west and three rolled stringer spans totaling 162 feet on the east.

The bridge roadway is a concrete structural slab. Concrete sidewalks with a structural steel railing will be provided on each side. The contractor must maintain traffic on Barley Mill Road.

Work must be completed by Sept. 30, 1952. Wage rates are: skilled laborers, $1.25; semi-skilled, $0.90; and common laborer, $0.75. Besides workman's compensation insurance, the contractor must furnish public liability and property damage insurance up to a $300,000 limit that will cover blasting and other special hazards. He will also furnish automobile and truck insurance up to $250,000 for damage to persons and $100,000 for damage to property.

Bidders included:

1 James Julian, Elsmere, Wilmington, Del. (Contract)	$600,703.75
2 Camden Construction Co., Baltimore, Md	634,375.50
8 Wilson Contracting Co., Wilmington	781,847.50

Items	Quantity	Unit prices 1 C	2
Clearing ..... A	2	$800.00	$500.00
Excav, rock ..... cy	900	20.00	17.10
Structure ..... cy	2,450	3.25	13.70
C C masonry, Abut & foot ..... cy	960	42.00	35.50
Abut & pier abv ftg ..... cy	2,780	59.50	50.50
Bdge & sidewk cy	590	60.00	73.00
Reinf steel ..... lb	363,500	0.14	0.12
Struct steel ..... lb	1,140,000	0.20	0.235
Soilbear test ..... en	2	1,480	650.00
Stone rip-rap ..... sy	630	7.00	15.25
Str steel rail ..... lf	1,755	19.75	23.00
Grout rock cav .... bbl	40	6.00	27.20
Cond & junc box .. ls	.....	10,850	3,000

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Recent labor data available on

So light a child can lift them

High Walls
Dams
Subway
Circular Tanks
Piers
Bridge Slabs
House Foundations
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IRVINGTON FORM & TANK CORP.
Irvington, 25 N. Y.

☐ Send Labor Data.
Send more information. I am interested in forms for.....
Name.....
Firm.....
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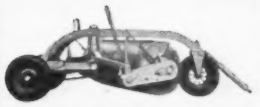
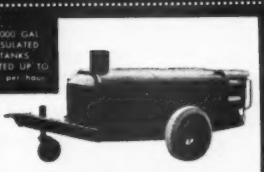
"Built-in Fibre Mileage"



with 36" Diameter Brush
GRACE 2-WAY SWEEPER

"Plenty of tough fibre and extra large diameter means extra mileage on Grace brushes."

10,000 GAL INSULATED TANKS HEATED UP TO 400° per hour



More Asphalt Heated per Hour with RAPID FIRE HEATER

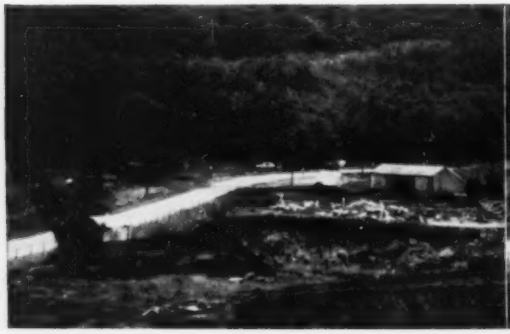
W. E. GRACE MFG. CO.

6015 S. Lamar St. Dallas, Texas

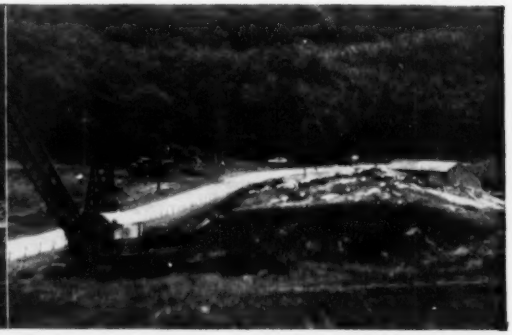
Watch this Blast

Machine-gun camera takes a photo every ⅛ second—shows what really *happens when a blast is shot.*

No wasted explosives gas



① *21 vertical holes, 9,700 pounds of dynamite ready to go.*



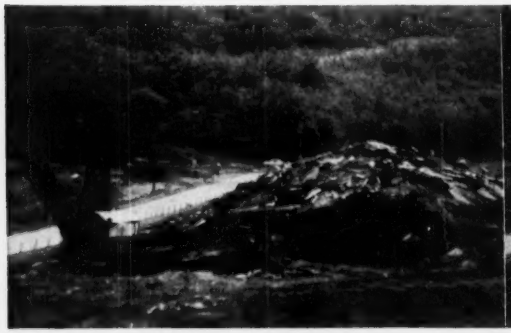
② *⅛ second later. See the rock "swell" at first instant of blast . . . but no sign of escaping gas.*

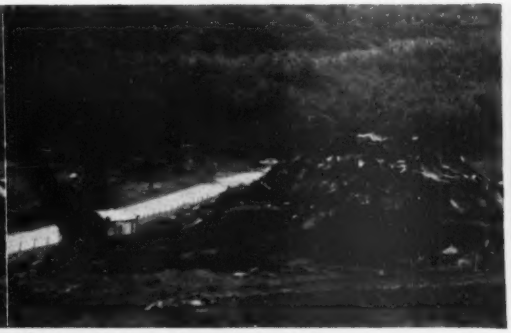
THIS was a typical ROCKMASTER blast by Fauzio Brothers at the Lehigh Navigation Coal Company's Nesquehoning, Pennsylvania stripping operation. Holes were 40 feet deep, with 18-foot spacing, 19-foot burden. The blast was initiated from the bottom of each hole, with ROCKMASTER Nos. 1, 2, 3, and 4 milli-second electric blasting caps.

Whether your job calls for blasting rock, coal, ore, ROCKMASTER blasting means true *controlled force . . . controlled throw . . . controlled breakage.* Write today for your copy of the ROCKMASTER booklet showing how you can profit through the use of the correct numbers of the *sixteen* ROCKMASTER milli-second delay electric blasting caps teamed with the ROCKMASTER system of explosives choice and loading methods. Our technicians will be glad to assist you in applying ROCKMASTER to your operation.

GO!

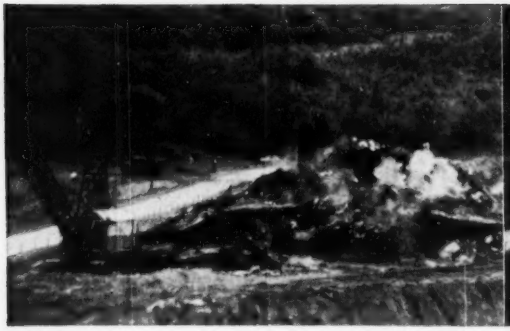
...No wild rock...even at the peak of the blast!

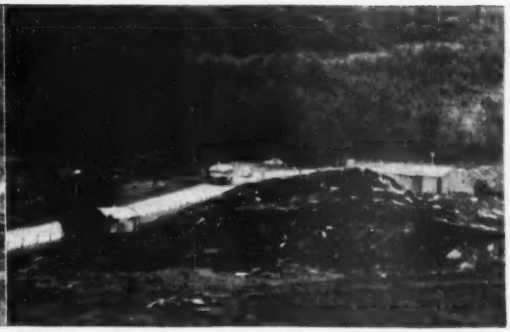




③ *⅛ second after Photo. No. 2. Rock going up... gases still confined where they do most work.*

④ *High point of the blast! Explosives gas has done maximum work.*





⑤ *As rock begins to fall, first traces of spent gases and smoke seep through broken rock. Burden completely shaken.*

⑥ *Rock ready for the shovel. Only three minutes after traffic was stopped it's on its way again.*

Rockmaster—Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

ELSIE EAVES, Manager **J. A. MAHONEY, Reports** **M. R. ROESSLER, Statistics**

NEW ENGLAND

LOW BIDDERS—BUILDINGS

Rich Bros. Constr. Co., 410 Park Square Bldg., Boston, Mass. Low Bidder. **$421,421.** Clarke SCHOOL, SWAMPSCOTT, MASS. Town, Supt. Schools, Swampscott, Mass. Bids Feb. 8. CD 1/25.

MIDDLE ATLANTIC

LOW BIDDERS—HEAVY CONSTRUCTION

▲ **Franklin Contg. Co.**, 12 Central Ave., Newark, N. J., Low Bidder, **$1,161,797**, construct Route 29, Sec. 7B, Dualization from Mercer St. to Thompson Ave. Somerville and Bridgewater, Somerset Co.; **A. J. Santanielle, Inc.**, 16 White St., Jersey City, N. J., **$352,039**, Rt. 4, Parkway Sections 6H and 7A grading from Myrtle to South Aves., Cranford, Union Co.; NEW JERSEY, State Hy. Dpt., Trenton, N. J. Bids Feb. 13. CD 1/25.

LOW BIDDERS—BUILDINGS

Sweeney Bros., 40 Poplar St., Scranton, Pa. Low Bidder, **$273,975.** general constr. MAINTENANCE BLDG. for Pennsylvania Hy. Dpt., HONESDALE, PA. Dpt. Property & Supplies, 1400 N. 9 St., Harrisburg. W. B. Jeffris, c/o owner, ch. engr. Bids Feb. 14. CD 1/30.

Raymond R. Hedden, Nanticoke, Pa. Low Bidder, **$327,360**. mens DORMITORY at Mansfield State Teachers College, MANSFIELD, PA. General State Auth., 18 and Herr Sts., Harrisburg, Pa. Thomas K. Hendryx, Box 173, Bradford, Pa., archt. A. F. Jones, c/o owner, ch. engr. Bids Feb. 14.

Diller Plank, Willow Street, Pa. Low Bidder, **$317,755**, general constr. AUDITORIUM at Millersville State Teachers College, MILLERSVILLE, PA. General State Auth., 18 and Herr Sts., Harrisburg, Pa. Bids Feb. 14. CD 1/24.

▲ **Baton Constr. Co.**, 1717 Sansom St., Phila., Pa. Low Bidder, **$1,227,000**, est. $1,000,000. general constr. Burrows (EDUCATION) Bldg., STATE COLLEGE, PA. General State Auth., 18 and Herr Sts., Harrisburg, Pa. Jack S. Steel Co., Phila. Natl. Bank Bldg., Phila., Pa., archts. A. F. Jones, c/o ch. engr. Bids Feb. 14.

Baton Constr. Co., 1717 Sansom St., Phila., Pa. Low Bidder. **$751,000.** sect. PHYSICAL EDUC. bldg. at Pennsylvania State College, STATE COLLEGE, PA. General State Auth., 18 and Herr Sts., Harrisburg, Pa. Bids Feb. 14. CD 1/24.

CONTRACTS—BUILDINGS

▲ **S. H. Ewert Co.**, Danville Rd., Bloomsburg, Pa. Contract Awarded. **$1,189,358**, CHEMISTRY STORAGE bldg., CHEMISTRY LABORATORY bldg. and Pond (Chemistry) LABORATORY addn., STATE COLLEGE, PA. General State Auth., 18 and Herr Sts., Harrisburg, Pa. Bids Jan. 10, Awarded Feb. 13. CD 1/15, under LB.

SOUTH

SOON LETS CONTRACT—BUILDINGS

S. C., Beaufort—HOUSING—Beaufort Housing Corp., Beaufort, soon lets contract 85 housing units.

LOW BIDDERS—HEAVY CONSTRUCTION

Aldrich Electric Co., Augusta, Ga. Low Bidder, **$299,144**, 104 mi. rural distr. lines, 121.49 mi. conversion in Lexington, Calhoun, Barnwille, Aiken, Edgefield and McCormick Counties, SOUTH CAROLINA. Aiken Electric Co-operative, Aiken, S. C. Bids Feb. 13. CD 1/31.

LOW BIDDERS—BUILDINGS

Goode Constr. Corp., Builders Bldg., Charlotte, N. C. Low Bidder, **$430,979.** HOSPITAL addn., walks, drives, etc. CHARLOTTE, N. C. Charlotte Memorial Hospital Auth., 1400 Scott Ave. Bids Feb. 9. CD 1/16.

Sam Lachman, c/o Henry Hohauser & Assocs., archts., 4011 Chase Ave., Miami Beach, Fla., rejected bids Jan. 15, HOTEL SURFSIDE, FLA. CD 1/23, under LB.

Try-Me Bottling Co., c/o Miller, Martin & Lewis, archts., Title Guarantee Bldg., Birmingham, Ala., rejected bids Feb. 2, BOTTLING PLANT ADDN., BIRMINGHAM, ALA. Project postponed indefinitely. CD 2/13, under LB.

CONTRACTS—BUILDINGS

Wm. Muirhead Constr. Co., Inc., Box 2012 Durham, N. C. Contract Awarded. **$752,000.** CHEMISTRY bldg. addn. "Venable Hall" CHAPEL HILL, N. C. University of North Carolina, Chapel Hill, N. C. Bids Jan. 16. CD 1/22, under LB.

▲ **H. L. Coble Constr. Co.**, Greensboro, N. C. Contract Awarded. **$3,037,417.** 400 units HOUSING on Freeman Mill Rd., GREENSBORO, N. C. Greensboro Housing Auth., Greensboro, N. C. Bids Nov. 28. CD 12/1, under LB.

MIDDLE WEST

BIDS ASKED—BUILDINGS

Ill., Antioch—SCHOOL—B.A. 3/9—Antioch Twp. High School, 1133 S. Main St., 2 story, steel, concrete, brick, stone high school addn. $600,000. Thos. J. Higgins, 228 N. LaSalle St., Chicago, Zone 1, consultant and Chas. W. Nicol, 23 E. Jackson St., Chicago, Zone 4, archt. CD 4/9/46.

Wis., West Allis—FACTORY—Bids Asked—LeRoi Co., 1706 S. 68 St., Zone 14, 1 story, 110x150 ft., concrete block, steel factory addn. V. K. Boynton, 611 N. Broadway, Milwaukee, Zone 2, engr.

SOON LETS CONTRACT—BUILDINGS

Ill., Chicago—HOSPITAL—Salvation Army, 717 S. State St., soon lets contract 3 story, steel, brick, terra cotta convalescent hospital, $300,000. A. C. Fehlow, 719 N. State St., Zone 10, archt.

LOW BIDDERS—BUILDINGS

Jezo Constr. Co., 7232 W. Greenfield Ave., West Allis, 14, Wis., Low Bidder, **$587,992**, general contract 2 and 1 story H-shaped 114x209 ft., ADMINISTRATION and DORMITORY at House of Correction, MILWAUKEE, WIS. Milwaukee Co., Court House, Milwaukee, Wis. Bids Feb. 9. CD 12/13.

CONTRACTS—BUILDINGS

▲ **Christman Co.**, 408 Kalamazoo Plaza, Lansing, Mich. Contract Awarded. **$1,300,000.** Brick, steel, concrete, 170,000 sq. ft. FOUNDRY, FLINT, MICH. Buick Motor Div. General Motors, Ivan L. Wiles, gen. mgr., Flint, Mich. Albert Kahn Associated Architects & Engineers, Inc., 345 New Center Bldg., Detroit, Mich., archt.

▲ **Frank J. Volk Bldg. Co.**, 207 N. Telegraph Rd., Dearborn, Mich. Owner Builds. **$1,250,000.** 130 single brick HOMES, LINCOLN PARK, MICH.

Wm. Rutledge Constr. Co., Monroe, Mich. Contract Awarded. **$450,000.** Brick, steel Charles Gauss Memorial Old Folks HOME, MONROE, MICH. Evangelical Lutheran Home, Monroe, Mich. Merritt & Cole, 7376 Grand River Ave., Detroit, Mich., archts. J. E. Stephens, 320 W. Lafayette St., Detroit, Mich., engr. CD 4/18/46.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

† **Nebraska**—B.A. 3/9—U. S. Eng., 1709 Jackson St., Omaha, underseepage control facilities for agricultural levees, near Namaha, Unit R 548, Inv. 90. CD 6/1/44.

LOW BIDDERS—HEAVY CONSTRUCTION

Texas Mausoleum Corp., c/o W. H. Johnson, et al, Littlefield Bldg., Austin, Tex., cancelled opening bids 588 crypt mausoleum. $450,000. AUSTIN, TEX. CD 1/9.

E. H. Keeder Constr. Co., 2128 Hawes St., Dallas, Tex. Low Bidder. **$170,906**, est. $163,000. 9 ft. storm sewer in Oaklawn Branch, H. Hines Blvd. to Maple St., DALLAS, TEX. City, City Hall, Main and Harwood Sts., Dallas, Tex. Bids Feb. 7. CD 1/30.

M & H Constr. Co., 4110 Holmes Rd., Houston, Tex. Low Bidder, **$94,809**, est. $69,300. asph. paving South Park Blvd., Malmedy Rd. to St. Lo Rd., HOUSTON, TEX. City, City Hall, 900 Brazos St., Houston, Tex. Bids Feb. 10. CD 2/2.

City, Friona, Tex., received no bids Feb. 7, 62 blocks 106,220 sq. yd. asph. type street paving, 42,165 ft. concrete curb and gutters, FRIONA, TEX. **$200,000.** Will re-advertise. CD 1/31.

LOW BIDDERS—BUILDINGS

▲ **The Simmons Co.**, 900 Blk. S. Lamar St., Dallas, Tex., cancelled opening bids 252,000 sq. ft. FACTORY, DALLAS, TEX. **$1,000,000.** CD 12/20.

CONTRACTS—HEAVY CONSTRUCTION

▲ **J. W. Moorman & Sons**, Wylie, Tex. Contract Awarded. **$1,452,877.** earthen dam, BIG SPRING, TEX. Colorado River Municipal Water Dist., Big Spring, Tex. Bids Feb. 7. Awarded Feb. 13. CD 2/13, under LB.

Sinclair Refining Co., Commerce Bldg., Houston, Tex. Own Forces. **$75,000.** clearing, earthwork in areas of 640 acre refinery tract, HOUSTON, TEX. CD 5/9/47, under Industrial Bldg.

▲† **C. L. Browning, Jr.**, Travis Bldg., San Antonio, Tex. Contract Awarded. **$3,115,000.** Air Force Base imprvs., barracks, various personnel housing and allied constr., LACKLAND AIR BASE (BR. SAN ANTONIO), TEX. U. S. Eng., 606 Santa Fe Bldg., Galveston, Tex. Awarded Feb. 12. CD 2/7.

City, Lubbock, Tex. Own Forces. **$90,000.** sanitary sewer lines, LUBBOCK, TEX. G. K. Harris, Lubbock, Tex., city engr. CD 1/29.

CONTRACTS—BUILDINGS

▲ **Harmon Constr. Co.**, 100 S. Indiana Ave., Oklahoma City 4, Okla., Contract Awarded, **$539,532**, est. $400,000, 5 story graduate EDUCATION bldg. addn.; **Builders Constr. Co.**, Kerr McGee Bldg., Oklahoma City, 2, Okla., **$530,019**, est. $400,000, GRADUATE EDUCATION bldg. at University of Oklahoma, NORMAN, OKLA. Board of Regents, Norman, Okla. Bids Jan. 18, awarded Jan. 31. CD 1/9.

C. S. Hackney, 1311 Castle Court, Houston, Tex. Own Forces. Approx. **$110,000.** 14,000 sq. ft. WAREHOUSE, Hardy and Sterrett Sts., HOUSTON, TEX. CD 11/13.

PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $34,000; other public works $60,000; industrial buildings $82,000; other buildings $300,000.

Classes of Construction

(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over.
B.A. Bids Asked
ENR Engineering News-Record
CD Engineering News-Record Construction Daily

FAR WEST

BIDS ASKED—BUILDINGS

Calif., Los Angeles — OFFICE — B.A. 3/6—Associated Veterans Aircraft & Auto Insurance, 2502 W. 6 St., 3 story, rein.-con. office, $395,000. Stiles Clements, Van Nuys Bldg., archt. CD 11/21.

LOW BIDDERS—HEAVY CONSTRUCTION

Warren Southwest, Inc., 20900 S. Normandie St., Torrance, Calif., Low Bidder, **$92,000**, remodel pontoon bridge, LONG BEACH, CALIF. Long Beach Harbor Dpt., 1333 El Embarcadero, Long Beach, Calif. Bids Feb. 9.

CONTRACTS—HEAVY CONSTRUCTION

† **MacDonald & Kruse**, 7540 Wheatland Ave., Los Angeles, Calif., Contract Awarded. **$678,464**, est. $750,000. Compton Creek imprvt. Lanzit Ave. to Main St., ENG 04-353-51-9, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Jan. 4. CD 1/11, under LB.

† **Transocean Engineering Corp.**, 15890 Hesperian Blvd., San Lorenzo, Calif. Contract Awarded. **$607,095.** constr. Sycamore Creek Rd., near Trimmer, CIVENG 04-167-51-14, CALIFORNIA U. S. Eng., Wright Bldg., Sacramento, Calif. Bids Jan. 23, awarded Feb. 2. CD 12/29.

† **Basalt Rock Co., P. O. Box 538, Napa, Calif. Contract Awarded. $97,200.** Rock cofferdam at Webb Tract Levee, San Joaquin River, San Joaquin Co., Spec. 1474, CALIFORNIA. U. S. Eng., Wright Bldg., Sacramento, Calif. Bids Dec. 28, awarded Jan. 22. CD 12/19.

H. Earl Parker, 12 and F Sts., Marysville, Calif. Contract Awarded. **$342,737**, core drilling and addnl. abutment excav. for Folsom Reservoir Site, Spec. 1475, CALIFORNIA. U. S. Eng., Wright Bldg., Sacramento, Calif. Bids Jan. 16, awarded Jan. 31. CD 12/18.

▲ **P & J Artukovitch**, 13305 S. San Pedro St., Los Angeles, Calif. Contract Awarded. **$2,159,378**, est. $2,000,000. 35,000 ft. 69-in. concrete lined and coated steel pipe, LOS ANGELES, CALIF. Dpt. Water & Power, 207 S. Broadway, Los Angeles, Calif. Bids Jan. 19, awarded Feb. 13. CD 12/3, under LB.

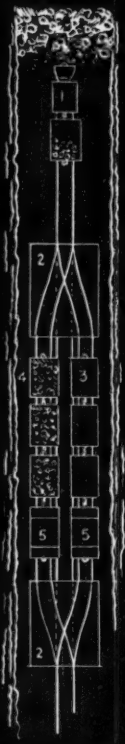
(Continued on page 60)

CASE HISTORY OF A SUCCESSFUL TUNNEL JOB

FROM THE EIMCO FILE T64

CONTINENTAL DIVIDE TUNNEL

The Continental Divide Tunnel (also known as the Alva B. Adams Tunnel) was driven on contract by three different contractors all using Eimco equipment for loading. Total length 13.3 miles, no intermediate openings. Longest contract 42,995 ft. Avg. advance per month for 37 months on longest contract — 1144'.



Interesting facts about this tunnel include: 1,800,000 man hours of labor were required to excavate the 310,000 yards of material, 480 miles of drill holes were required and 1,240 tons of powder were used.

For switching cars at the heading a double track passing switch was built to slide along on top of the permanent track. See illustration at left: 1. Eimco Model 21 Loader. 2. Double track switch mounted on plate to slide on permanent track. 3. Empty cars. 4. Loaded cars. 5. Locomotive.

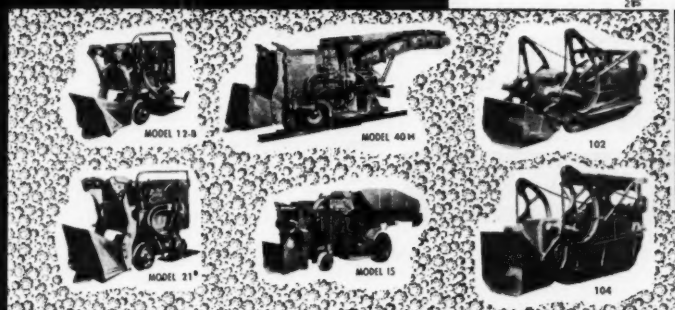
Successful tunneling is dependent on arriving at a satisfactory cycle of drilling, blasting and mucking, then repeating the cycle as fast and as often as possible.

Contractors who have been most successful in working out this formula have been most emphatic in saying that dependable equipment means most in maintaning the pace that pays dividends.

Eimco equipment for loading is dependable. "It's meant the difference between success and failure on our job," says one superintendent.

There's an Eimco Rocker Shovel for every size tunnel and for speed, economy and dependability you can't beat an Eimco.

EIMCO



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(Continued from page 58)

ALASKA

LOW BIDDERS—HEAVY CONSTRUCTION

† **U. S. Eng.** (APO 942, c/o PM, Seattle, Wash.) Anchorage, Alaska, deferred project indefinitely, enlisted mens post exchange at Ladd Air Force Base, Inv. No. S95-507-51-48, ALASKA. CD 2/15.

CANADA

BIDS ASKED—HEAVY CONSTRUCTION

Ont., Toronto—B.A. 3/5—North York Twp., 5145 Yonge St., 6,200 lin. ft. 8- to 30-in. storm and sanitary sewers and sewage pressure mains. G. H. Baker, 8 Kingsdale Ave., Willowdale, twpe engr.

BIDS ASKED—BUILDINGS

Ont., Norwich—HIGH SCHOOL—B.A. 2/28—Norwich District High School Bd., A. L. Bushell, secy., Norwich, 1 story, brick, concrete high school, $300,000. Plans deposit $25. S. B. Coon & Son, 4 St. Thomas St., Toronto, archts. CD 11/2.

Ont., London—HOSPITAL—B.A. in April—Parkwood Hospital Bd., Mrs. David Nichol, pres., London, 3 story, 40x 200 ft., red brick stone hospital addn., $465,000. O. Roy Moore, 260½ Dundas St., archts.

CONTRACTS—BUILDINGS

Benjamin Robidas, 164 Moulin St., Drummondville, Que., Contract Awarded, Approx. $300,000, 3 story, bunnt., 34x240 ft., concrete, steel, rein.-con. frame, T-shaped, RETREAT HOUSE, DRUMMONDVILLE, QUE. Rev. de La Compagnie, de Marie, Nicolet, Que. CD 3/27/50.

PROPOSED PROJECTS

WATER SUPPLY

Ill., Robbins—Village, Village Hall, water dist. sys. sewerage sys., $900,000. Walter Wilson, 1509 W. Jackson Blvd., Chicago, Zone 7, consult. engr.

▲ **La., Thibodaux**—Lafourche Parish Water Dist. 1, voted bonds Feb. 5. WW imprvs. $5,000,000. CD 1/3.

Md., Annapolis—City Council authorized plans on water and sewers in Wardour and West Annapolis, $327,500; Annapolis neck feeder water main, $220,000; water and sewers Parole and Fairfax Rds., $324,400, water transmission lines, $141,000. Whitman, Requardt & Assoc., 1304 St. Paul St., Baltimore, Zone 2, consult. engrs. CD 2/7/45, under Sewers, Waste Disposal.

Tex., Snyder—City, voted bonds, water filtration plant. $275,000; exten., imprv. sewerage sys., new lines, etc. $325,000. Freese & Nichols, 407 Danciger Bldg., Fort Worth, consult. engrs.

SEWERS, WASTE DISPOSAL

▲ **Del., Wilmington**—Street & Sewer Dpt., Wilmington, underwater sewer pipe lines, Contr. 4, $370,000; interceptor sewer Contr. 5, various locations, $1,400,000; interceptor sewer, Sewer No. D, Contr. 6, location to be announced, $500,000; sewage treatment plant, Contr. 7, $300,000; station and sewers, Contr. 8, $100,000. Whitman, Requardt & Assoc., 1304 St. Paul St., Baltimore Md., consult. engrs. Edwin Koester, city engr.

Pa., Neville Island (Br. Pittsburgh)—Twp. Comrs., Twp. Bldg., sewage treatment works. $300,000. Consoer, Townsend & Assoc., 351 E. Ohio St., Chicago, 11, Ill., consult. engr. CD 11/1/45.

Wis., La Crosse—City, sewage treatment plant addn., sanitary sewers, $561,000. J. Donohue Eng. Co., 608 N. 8 St., Sheboygan, consult. engr.

BRIDGES

▲ **Arkansas**—State Hy. Dpt., Little Rock,
Pulaski Co.—erecting highway toll bridge across Arkansas River at Little Rock, $7,500,000.

▲ **Colorado**—State Hy. Dpt., Denver,
Arapahoe Co.—railroad alignment on State Hy. 70, Denver-South Colo. Fed. Aid Proj. F 002-2 (2), $250,000.
Garfield Co.—bridge on State Hy. 82, in Glenwood Springs, Colo. Fed. Aid Secondary Proj. S 0130 (2), $500,000.
Jefferson and Clear Creek Counties—tunnel lining surf, paving State Hys. 20 and 182, Golden, Colo. Fed. Primary Proj. F 005-3 (7) and F 005-3 (8) $700,000.
Moffat Co.—bridges, grading, paving, State Hy. 2, Craig-East, Colo. Fed. Aid Proj. F 005-2 (9), $150,000.
Washington Co.—bridges State Hy. 54, Akron West, Colo. Fed. Aid Primary Proj. F 011-1 (4), $50,000. Mark U. Watrous, state hy. engr.
Ill., Chicago—City, City Hall, Zone 2, Roosevelt Road viaduct reconstruction, $790,000. Dpt. Viaducts & Bridges, Stephen Michuda, ch. engr. CD 3/4/45.

▲ **New Jersey**—State Hy. Dpt., Trenton.
Bergen Co.—grade separation, Route 17, $1,000,000.
Burlington Co.—Route 25 and 29 Bordentown overpass, $900,000.
Essex Co.—Newark approach exten. to Stickel Memorial Bridge over Passaic River.
High St. approach, $2,920,000.
Hudson Co.—Tonnelle Ave. overpass, $1,000,000.

† Washington—U. S. Eng., 19 E. Poplar St., Walla Walla, replacing Northern Pacific Ry. bridge over Columbia River, at Pasco. $3,000,000. CD 8/23/45, under Earthwork, Waterways.

STREETS AND ROADS

▲ Colorado—State Hy. Dpt., Denver,

Adams Co.—grading, draining, paving Valley Hy.-Northwest Colo. State Proj. $276,789.

Alamosa Co.—grading, surf. State Hy. 370, Alamosa, Colo. Fed. Aid Secondary Proj. S 0120 (1), $68,000. grading, surf. State Hy. 112, Center-Hooper, Colo. Fed. Aid Secondary Proj. S 0122 (5) $80,000.

Arapahoe Co.—grading, surf. State Hy. 70, Denver-South Colo. Fed. Aid Secondary Proj. S 0055 (1) $100,000.

paving State Hy. 250, Denver, Co. State Proj. SP-10-250-501, $65,000.

wid'n., surf. State Hy. 70, Denver Colo. Fed. Aid Urban Proj. U 002-2(22). $60,000.

Baca Co.—grading, surf. State Hy. 100, Springfield-West, Colo. Fed. Aid Secondary Proj., $136,000.

Custer Co.—grading, surf. State Hy. 69, Westcliffe-North, Colo. Fed. Aid Proj. S 0038 (6), $200,000.

Delta Co.—grading, surf. State Hy. 65, Cedaridge-South, Colo. Fed. Aid Secondary Proj. S 0131(1), $320,000.

Denver Co.—right-of-way, Valley Hy., Denver, Colo. Fed. Aid Urban Proj. UI 002-2(9), $2,519,840.

grading, draining, paving part of Valley Hy., Colo. Fed. Primary Proj., Denver-Northwest, $430,000.

Douglas Co.—grading, draining, paving State Hys. 1 and 85, Denver-Castle Rock Colo. Primary Fed. Aid Proj. FI 002-2(2), $700,000.

paving, right-of-way State Hys. 1 and 85, Denver-Castle Rock Colo. Fed. Aid Primary Proj. FI 002-2(15), $1,485,000.

grading, surf State Hy. 86, Castle Rock-Franktown, Colo. Fed. Aid Proj. S 0040 (2), $80,000.

El Paso Co.—grading, surf. State Hy. 94, east of Colorado Springs, Colo. Fed. Aid Secondary Proj. S 0020 (3), $140,000.

Fremont Co.—grading, surf. State Hy. 67, Florence-Wetmore, Colo. Fed. Aid Secondary Proj. S 0081 (1), $100,000.

Garfield Co.—grading, paving, draining, State Hy. 4, DeBeque-Rifle Colo. Fed. Aid Primary Proj. F 001-1 (3) and F 001-1 (4), $300,000.

grading, draining, paving, State Hy. 13, Rifle-North, Colo. Fed. Aid Primary Proj. F 018-1 (7), $225,000.

Grand Co.—grading, surf. State Hy. 9, Kremmlin-South Colo. Fed. Aid Secondary Proj. S 0107 (4), $114,000.

Jackson Co.—grading, surf. State Hy. 125, Walden, Colo. Fed. Aid Secondary Proj. S0103(1), $80,000.

grading, surf. State Hy. 14, Nebron-South, Colo. Fed. Aid Secondary Proj. S 0115(4). $170,000.

Kiowa Co.—grading, surf. State Hy. 96, Eads-East, Colo. Fed. Aid Secondary Proj. S0016 (7), $72,000.

Kit Carson Co.—surf., oiling State Hy. 51, Burlington North, Colo. Fed. Aid Secondary Proj. S0001 (5), $100,000.

LaPlata Co.—ballast, paving State Hy. 10, Durango-West, Colo. Fed. Aid Primary Proj., F 022-1(6), $200,000.

grading, draining, paving State Hy. 10, Durango-Bayfield, Colo. Fed. Aid Primary Proj. F 022-2(5), $500,000.

grading, surf. State Hy. 172, Ignatio-Faifa, Colo. Fed. Aid Secondary Proj. S 0154(5), $100,000.

Larimer Co.—Urban steet wid'n. proj., State Hy. 14, Ft. Collins, Fed. Aid Primary Proj., F 004-1 (17), $60,000.

Lincoln Co.—grading, surf. State Hy. 71, Limon-South, Colo. Fed. Aid Secondary Proj., S0027(2), $60,000.

Logan Co.—grading, surf. State Hy. 61 at junction of 154 and 61, Colo. Fed. Aid Secondary Proj. S0009 (3), $100,000.

grading, surf. on State Hy. 14, Weld Co. Line-East, Colo. Fed. Aid Secondary Proj. S 0024 (6), $80,000.

Mesa Co.—right-of-way, grading State Hy. 4, Palisade West, Colo. Fed. Aid Primary Proj. F 001-1 (2), $100,000.

street wid'n., State Hy. 4, in Grand Junction, Colo. Fed. Aid Primary Proj. F 0001-1(5) $100,000.

Mineral Co.—grading, surf. Hy. 149, Creede-South Fork, Colo. Fed. Aid Secondary Proj. S 0117(1), $200,000.

Morgan Co.—grading, surf. State Hy. 71, Brush, Colo. Fed. Aid Secondary Proj. S 0021 (1), $100,000.

grading, surf. State Hy. 52, Fort Morgan-North, Colo. Fed. Aid Secondary Proj. S 0029 (1), $100,000.

Montrose Co.—grading, paving State Hy. 145, Norwood-Naturita, Colo. Fed. Aid Primary Proj. F 020-1 (3), $100,000.

Prowers Co.—stabilizing, paving State Hy. 6, Holly-East, Colo. Fed. Aid Primary Proj. F 001-5(4), $60,000.

stabilizing, paving State Hy. 6, Lamar-Granada Colo. Fed. Aid Primary Proj. F 001-5(3), $110,000.

Pueblo Co.—oiling, surf. State Hy. 165, Rye-San Isabel, Colo. State Proj. SP 2-165-502, $60,000.

grading, surf. State Hy. 96, Pueblo East, Colo. Fed. Aid Secondary Proj. S 0016 (6), $200,000.

grading, surf. State Hy. 96, Pueblo-West Colo. Fed. Aid Secondary Proj. S-0016 (5), $200,000.

wid'n., resurf., pavement State Hy. 1, Pueblo-Fountain, Colo. Fed. Aid Primary Proj. FI-002-2(16), $240,000.

Rio Blanco Co.—grading, surf., oiling State Hy. 64, Artesia-Rangeley, Colo. Fed Aid Secondary Proj. S 0144 (11), $200,000.

Rio Grande and Mineral Counties—stabilizing, paving State Hy. 10, South Fork-Twin Bridges, Colo. Fed. Aid Secondary Proj. F 022-2(4), $240,000.

Saguache Co.—grading, surf. oiling on State Hy. 112, Center-Hooper, Colo. Fed. Aid Secondary Proj. S 0122 (5), $80,000.

San Juan Co.—paving State Hy. 19, Coal Bunk Hill North of Durango Colo. Fed. Aid Primary Proj. F 019-2(4), $129,560.

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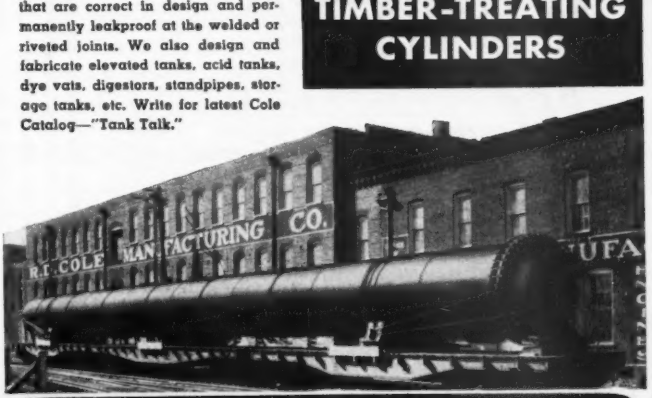

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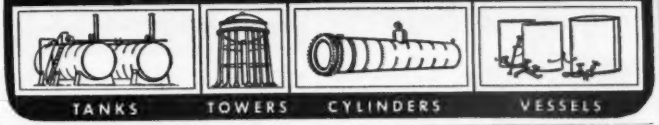

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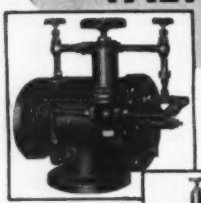
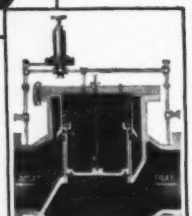


G-A Surge Relief Valve. Bulletin W-2 sent on request.



G-A Water Pressure Reducing Valve. Bulletin W-3 contains the technical information you want.

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San Miguel Co.—grading, surf. State Hy. 145, Placerville-Telluride Colo. Fed. Aid Proj. S0150(3), $60,000.

Summit Co.—stabilizing, paving State Hy. 91, Climax-Kokomo, Colo. Fed. Aid Primary Proj. F 014-1(1), $125,000.

Weld Co.—grading, surf. State Hy. 14, Ault-West, Colo. Fed. Aid Secondary Proj. S 0024(3), $230,000. grading, surf. State Hy. 52, Hudson-East, Colo. Fed. Aid Secondary Proj. S 0030(2) $100,000. grading, surf. State Hy. 14, Briggsdale-East, Colo. Fed. Aid Secondary Proj. S 0024(5), $100,000. stabilizing, paving State Hy. 2, Denver-Wiggins, Colo. Fed. Aid Primary Proj. FI 003-1(3), $500,000. grading, draining, paving, State Hy. 3, Greeley-South, Colo. Fed. Aid Primary Proj. F 006-1(6), $650,000. Mark U. Watrous, state hy. engr.

▲ New Jersey—State Hy. Dpt., Trenton,

Bergen Co.—Route S-28 Palisades Inter-State Parkway, $3,210,000.

completion of Route S-3 to Hackensack River, $175,000.

Cape May Co.—Route 4 Freeway, Cape May Court House to Rio Grande, $1,750,000.

Mercer, Middlesex and Somerset Counties—Route 27 Kingston imprvs., $600,000.

Mercer Co.—Trenton Freeway, completion $1,750,000.

Middlesex Co.—New Brunswick imprvs., $468,000.

Monmouth Co.—Route 34 dualization, $2,500,000.

Morris and Passaic Counties—paving Route 23, Smith Mills to Stockholm, $1,165,000.

Morris Co.—Route 32, Route 6 to Route 10, $2,500,000. Route 6, Ledgewood to Netcong, $1,500,000.

Ocean Co.—Route 4 Parkway, Toms River by-pass complete, $1,674,000.

Salem and Gloucester Counties—Route 44 imprvs., $4,432,000.

Somerset Co.—Route 29, $1,630,000. intersection revisions, state wide, $133,000. Route 4 Parkway, Centennial Ave., Clark Twp. to Essex Co. line, $8,123,000. trans-Bayonne Freeway $468,000.

▲ Pennsylvania—Pennsylvania Turnpike Comn., 11 N. 4 St., Harrisburg, exten. Pennsylvania Turnpike system from Erie to Scranton. Enabling legislation introduced in State Senate. $150,000,000. R. B. Stone, c/o owner, ch. engr.

EARTHWORK, WATERWAYS

▲† California—U. S. Eng., 751 S. Figueroa St., Los Angeles, Rio Hondo Channel Imprvt., S. P. Railway to Los Angeles River, Downey, CIVENG-04-353-51-23, Approx. $1,000,000; San Diego Harbor and Mission Bay Imprvt., San Diego, CIVENG-04-353-51-22, Approx. $500,000.

▲ New Hampshire—New England Power Co., 441 Stuart St., Boston, Mass., dam and hydro-electric power plant at Upper Fifteen-Mile Falls, near Littleton. $45,000,000.

▲ Washington—Pend Oreille Co. Public Utility Dist., Newport, hydro-electric dam at Box Canyon on Pend Oreille River, Ione, $11,000,000. Harza Eng. Co., 400 W. Madison Ave., Chicago, Ill., consult. engr. CD 2/9.

▲ Quebec—Gulf Pulp & Paper Co. Ltd., 65 St. Anne St., Quebec City, dam and hydro-electric power station On Ste. Marguerite River near Seven Islands. Approx. $2,800,000. Stradler, Hurter & Co., 1117 St. Catherine St. W., Montreal, Que., engrs. CD 1/26.

AIRPORTS

▲† Ariz., Goodyear—HANGAR, etc.—Bureau Yards & Docks Annex, Navy Dpt., Arlington, Va., 2nd hangar, admin. bldg., barracks, radio receiving station, storage, fencing at Litchfield Naval Air Facility. $3,064,000. Milligan, Sawyer & Pistor, 31 W. Cambelback Rd., Phoenix, archts. and engrs.

▲† Kan., Olathe—AIRPORT IMPRVS.—Ninth Naval Dist., Great Lakes, Ill., air unit expansion, bldgs., runways, etc. $3,368,950. Burns & McDonnell Eng. Co., 95 and Troost Sts., Kansas City, Mo., consult. engr.

N. C., Charlotte—TERMINAL—City, City Hall, plans by W. W. Hook & Assoc. 303½ W. 4 St., terminal at Municipal Airport. $810,000. CD 3/26/47.

▲ O., Cleveland—ADMINISTRATION BLDG.—City, City Hall, Lakeside and 6 Sts., plans by Outcault, Guenther & Assoc., Shaker Square, administration bldg., Cleveland Airport. $4,000,000. CD 11/14.

▲† Tex., Amarillo—AIRPORT IMPRVS.—U. S. Eng., P. O. Box 61, Tulsa, Okla., construct utilities, $6,000,000; construct streets and roads, $560,000, for Amarillo Air Force Base. Hasie & Green, Wilson Bldg., Lubbock, engrs. CD 2/2.

▲† Tex., Kelly Air Force Base (Br. San Antonio)—DEFENSE FACILITIES—U. S. Eng., 606 Santa Fe Bldgs., Galveston, plans by Bartlett Cocke, 3501 Broadway, San Antonio, maintenance communications bldg. $1,836,000; propellant storage bldg. $175,000; ground-controlled approach facility units, incl. earthwork, $65,000; hazardous test bldg., $182,000; R4360 engine test cells for maintenances, Projects 1, 2, 3, and 4, $200,000 each. W. E. Simpson Co., 945 Milam Bldg., San Antonio, consult. engr. CD 2/2.

▲† Tex., San Marcos—HOUSING, etc—U. S. Eng., 606 Santa Fe Bldg., Galveston, air force base housing rehabilitation. $550,000; new building constr. $1,250,000; construction and paving areas for helicopters, $495,000; area grading and drainage, $200,000; street and road constr. and paving, $450,000; sanitary sewers, $100,000; WW, $90,000; repair shops, $250,000, at San Marcos Liason and Helicopter Training Air Force Base.

▲† Tex., Wichita Falls—AIR BASE—U. S. Eng., 1127 T and P Bldg., Fort Worth, misc. constr. and facilities, $3,750,000; WW, $250,000; taxiways, runways, $4,000,000; warehousing; $1,000,000; street and road constr. and paving $400,000; hangars, $500,000; sanitary and storm sewers, $225,000, at Shepherd Air Force Base.

▲† Va., Oceana—AIRFIELD—Fifth Naval Dist., Naval Station, Norfolk, Va., airfield developments at Naval Auxiliary Air Station, $10,000,000. Hayes, Seay, Mattern & Mattern, 118 Campbell Ave. S. W., Roanoke, and Harley, Ellington & Day, Inc., 153 E. Elizabeth St., Detroit, Mich., engrs.-archts.

▲† Alaska—AIR BASE BLDGS., etc.—U. S. Eng. (APO 942, c/o PM, Seattle, Wash.) Anchorage, plans by G. Stanton, Concord Bldg., Portland, Ore., infirmary, $164,000; oil facilities, $2,000,000; fueling sys. $850,000. J. F. Pritchard & Co., 908 Grand St., Kansas City, Mo., consult. engr.; plans by P. Belluschi, 2040 S. W. Jefferson St., Portland, Ore., enlisted mens service club, $330,000; plans by Manley & Mayer, Loussac-Sogn Bldg., Anchorage, phone exchange, $191,000; plans by L. Thomas, Equitable Bldg., Portland, Ore., refrigerator bldg., $486,000, Eilson Air Force Base. CD 11/27.

LATIN AMERICA

Chile, Puente Alto—Cia Manufacturera de Papeles and Cartones, Santiago, Chile, plans cellulose plant. $500,000.

Mexico—National Railways of Mexico, Bolivar, 21, Mexico City, plans shops reconstruction at Orizaba and Apizaco. $693,000.

PUBLIC BUILDINGS

Ala., Auburn—HOUSING—Auburn Housing Auth., Auburn, plans by Geo. G. Blau, 212 Bona Allen Bldg., Atlanta, 75 housing units. Approx. $500,000. CD 12/19/49.

▲ Ala., Mobile—SCHOOLS—Mobile Co. Bd. Educ., Court House, Satsuma Junior High School, $300,000; Chickasaw High School, $795,000; Owens School, $300,000; Prichard High School, $719,000; Craighead Junior High School, $300,000; Zimlich Junior High School, $650,000; Toulminville White High School, $650,000; Toulminville Negro High School, $530,000.

▲ Ala., Tuscaloosa — HOUSING — Tuscaloosa Housing Auth., c/o Wm. I. Rosamond, archt., Propst Bldg., Columbus, Miss., 160 housing units for whites and 340 housing units for colored, Approx. $3,500,000.

Calif., Alameda—SCHOOL—DeSoto Elementary School Dist., Alameda, school. $670,591.

Calif., China Lake—SCHOOLS—China Lake Elementary School Dist., China Lake, plans by H. L. Gogerty, 3123 W. 8 St., Los Angeles, 2 schools at Inyokern for district. $950,000.

Calif., Kentfield—SCHOOL—Fairfax Elementary School Dist., Fairfax, school. $587,356.

▲ Calif., Palto Alto—SCHOOLS—Palo Alto City Uniform School Dist., Box 149, Palo Alto, $4,000,000 bond election Mar. 24, 2 school addns.

Calif., Rodeo—SCHOOL—Rodeo Elementary School Dist., Rodeo, voted $587,000 bonds, schools. CD 3/31.

▲ Calif., San Francisco—SCHOOL—Bd. Educ., City and San Francisco Co., Civic Center, San Francisco, plans by Weihe, Frick & Kruse, 25 Kearny St., rein.-con. Abraham Lincoln School. $2,889,000. CD 11/17/48.

▲ Calif., San Pablo—HOSPITAL—West Contra Costa Hospital Dist., Richmond, plans by Stone & Mulloy, 619 California St., San Francisco, 5 story, 85,000 sq. ft., rein.-con. hospital. $2,000,000. W. Adrian, 417 Market St., San Francisco, consult. structural engr.

Calif., Santa Clara—SCHOOLS—Jefferson Union School Dist., 934 Hilmar St., Santa Clara, 2 schools. $577,860.

▲ Calif., Ventura—SCHOOL—Ventura Union High School Dist., Ventura, voted $5,750,000 bonds, Junior College, Junior High School, gymnasium and swimming pool. CD 12/19.

Calif., Yuba City—SCHOOL, etc.—Yuba City Union High School Dist., Yuba City, $600,000 bond election Mar. 16, school and gymnasium.

Conn., New Milford—SCHOOL—Town Bd. Educ., plans by Carl Malmeldt & Assoc., 36 Pearl St., Hartford, school, Fort Hill Fairgrounds. $940,000. CD 11/14.

Conn., Norwalk—HOUSING—City of Norwalk Housing Auth., Washington Village, South Norwalk, plans by Holden McLaughlin & Assoc., 570 Lexington Ave., New York, N. Y., and Gilroy & Gaydosh, 64 Wall St., New York, N. Y. 200 unit housing, Springwood area. $500,000.

Idaho, Pocatello—LIBRARY—Idaho State College, Pocatello, library. $750,000.

▲† Ill., Rockford—ORDNANCE PLANT—Dpt. Army, Pentagon Bldg., Wash., D. C., Rockford Ordnance Plant. $3,000,000. Will be operated by W. F. & John Barnes Co., Rockford, Ill.

▲† Ind., Charlestown—ORDNANCE PLANT—Dpt. Army, Pentagon Bldg., Wash., D. C., Hoosier Ordnance Plant. $3,588,000; reactivation and rehabilitation Indiana Ordnance Works. $8,966,000.

▲ Ind., Fort Benjamin Harrison—FINANCE CENTER—Dpt. Army, Pentagon Bldg., Wash., D. C., plans by Harley Ellington & Day, 153 E. Elizabeth St., Detroit, Mich., finance center. $20,000,000.

Ind., Gary—SCHOOL—School City of Gary, 524 Garfield St., plans by Perkins & Wills, 309 W. Jackson St., Chicago, 6, Ill., and Beine Hall & Curran, 607 Broadway, assoc. archts. 2 story, bsmnt. school, Jackson and 27 Sts. $400,000. CD 11/26/47.

▲ Mich., Flint—COLLEGE—Flint Junior College, W. Fred Totten, pres., brick, steel college. $1,600,000. Bond issue approved.

Mich., Traverse City—COMMUNITY COLLEGE—City, Dr. Glenn Loomis, supt. Schools, brick, steel community college to serve 7 counties. $500,000.

Minn., Willmar—SCHOOLS—Bd. Educ., Alice C. Hedin, clk., bond election Feb. 20, grade school, two school addns. $525,000. Bids 2/7 rejected. CD 2/14, under LB.

N. C., Raleigh—HIGH SCHOOL—City School Bd., Raleigh, plans by Wm. H. Deitrick, 115 W. Morgan St., Needham Broughton High School addn., St. Mary's St. $700,000. CD 4/26.

▲ N. C., Raleigh — SCHOOL — Raleigh School Bd., Raleigh, plans by Cooper & Hoskins, Raleigh Bldg., Negro, Junior-Senior High School, in Chairs Heights, Lenoir St. $1,000,000. CD 4/26.

Pa., Carlisle—HOUSING—Dpt. Army, 121 N. Broad St., Phila., plans by Walter K. Durham, 1606 Latimer St., Phila., construct, manage, finance 100 family units, Carlisle Barracks, Medical Field Service School. $800,000.

Pa., Doylestown—COURT HOUSE, etc.—Comrs., Bucks Co., Doylestown, court house and office. Approx. $500,000.

▲ Pa., Phila.—HOUSING—Phila. Housing Auth., 42 S. 15 St., plans by David H. Morgan, 112 S. 16 St., Abbotts Project, low rent housing development. $1,000,000. CD 9/12/49.

Tenn., Lebanon—HOUSING—Lebanon Housing Auth., c/o Wallace & Clemmons, archts., 1911 Division St., Nashville, 80 housing units. $650,000. CD 12/30/49.

▲† Tenn., Millington—BARRACKS, etc.—Bureau Yards & Docks Annex, Navy. Dpt., Arlington, Va., plans by Wyatt C. Hedrick, archt. and engr., 904 Fort Worth Ave., Dallas, Tex., concrete, brick barracks and mess halls, 8,000 ft. runways, Naval Air Technical Training Station. $6,000,000.

† Tenn., Oak Ridge—HOUSING—Atomic Energy Comm., c/o Roane-Anderson Co., Oak Ridge, Tenn., plans by Stevens & Wilkinson, 157 Luckie St. N. W., Atlanta, Ga., 42 housing units for Atomic Energy Comm. Personnel. $550,000

▲† Tex., Corpus Christi—HOUSING—Dpt. Navy, c/o Naval Base, Corpus Christi, 140 frame, stucco, two-bedroom housing unit, $1,050,000; 75 three-bedroom, frame, stucco housing units, $800,000; 125 one-bedroom housing units, probably brick exterior, $750,000. McClendon & Assoc., 127 N. Staples St., consult. engrs.

† Tex., Fort Sam Houston—CAMP REHABILITATION—U. S. Eng., 606 Santa Fe Bldg., Galveston, plans by V. L. Beavers & Assoc., engrs.-archts., Transit Tower, San Antonio, rehabilitation Camp Bullis area of the Leon Springs Military Reservation, near here.

▲ Tex., Fort Worth—SCHOOLS—White Settlement School Dist., Cyrus Bewer, supt., 8153 White Settlement Rd., plans by A. B. Withers Co., Insurance Bldg., high school, $400,000; Projects 1 and 2, masonry elementary schools, $300,000 each.

▲† Tex., Houston—HOSPITAL—Veterans Admin., G. W. Singleton, supt., Marlborough Dr., hospital addn., Holcombe Blvd. at Almeda Rd. $1,750,000.

▲ Tex., Pasadena — SCHOOL — Pasadena Independent School Dist., Pasadena, plans by Lloyd & Morgan, 4605 Montrose St., Houston, combination Junior High and elementary school addn. to present high school. $2,075,000. CD 12/6.

▲† Washington—STEAM POWER GENERATING PLANTS—Bonneville Power Admin., P.O. Box 3537, Portland, Ore., steam power generating plant, Port Angeles, $15,000,000; steam power generating plant, Longview, $15,000,000.

▲ W. Va., Fairmont—CIVIC CENTER—City, City Hall, plans by Lewis E. Stettler, 926 6 Ave., Huntington, 5 story, 153x229 ft., brick on block civic center, $1,000,000.

▲† Alaska, Fort Richardson—CIVILIAN MESS, etc.—U. S. Eng. (APO 942, c/o PM, Seattle, Wash.) Anchorage, plans by Foss & Malcolm, Goldstein Bldg., Juneau, civilian mess and lounge, $350,000, oil drum reconditioning and filling bldg., $400,000, A. Stoyanov, 833 N. Shaver St., Portland, Ore.) plans by G. Stanton, Concord Bldg., Portland, Ore., vehicle warm storage bldg., $400,000; plans by Jones & Bindon, Hoge Bldg., Seattle 4, Wash., fire station, $200,000. CD 11/27.

Ont., Ingersoll — SCHOOL — Ingersoll District High School Bd., R. W. Greer, chn., Ingersoll, plans by Shore & Moffatt, 79 Queen St. E. Toronto, high school. $750,000. CD 12/13/49.

Que., St. Josepn D'Alma—SCHOOL—School Comn., St. Joseph D'Alma, plans by Lamontagne & Gravel, 187 Racine St., Chicoutimi, school. Approx. $500,000.

COMMERCIAL BUILDINGS

▲ Calif., Los Angeles — DWELLINGS — Wilbur Square, 5143 Sunset Blvd., plans by Charles Du Boise, 2342½ Beverley Glen Blvd., 324 frame, stucco dwellings in tract 1406 and 15107. $2,916,000.

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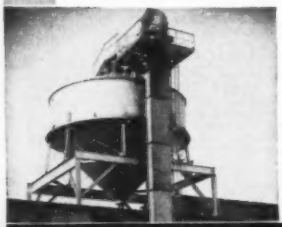

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▲ **Calif., San Jose**—HOSPITAL—Daughters of Charity of St. Vincent De Paul, San Jose, plans by Maguolo & Quick, 4908 Delmar St., St. Louis, Mo., and Frank T. Georgson, 355 Stockton St., San Francisco, Type 1, 4 story, bsmt. rein.-con. concrete hospital. O'Connor Hospital site, $3,000,000; nurses home $1,000,000.

▲ **Del., Newark**—RESIDENCES, etc.—L. W. Ricards, 1014 Washington St., Wilmington, residences and apartment development east end of Newark. $5,000,-000.

▲ **Ky., Paducah**—HOMES—Kentucky Industries, Inc., c/o Justin & Potter, Commerce Union Bank, Nashville, Tenn. 600 homes. $2,000,000.

▲ **La., Lake Charles**—HOMES—Charles K. Bunker, Lake Charles, 370 homes. $2,000,000.

▲ **Mass., Fitchburg** — HOSPITAL — Burbank Hospital, Nichols St., plans by Curtin & Riley, 45 Newbury St., Boston, brick, steel, concrete hospital, Nichols St. $2,500,000. CD 2/2.

▲ **Mass., Worcester**—SHOPPING CENTER—R. D. Moore Assoc., 50 Frank St., plans by Albert J. Roy, 120 Front St., exterior, and Adolph Novak, 82 Beaver St., New York, N. Y., interior, granite, brick Lincoln Plaza Shopping Center, incl. dpt. store, super market, 2 banks, etc. 24½ ma. from city center, $5,000,000. CD 12/8/49.

▲ **N. Y., Jamaica**—APARTMENTS—Harry L. Osias, 233 Broadway, New York, Zone 17, plans by Oscar I. Silverstone, 153 Pierrepont St., Brooklyn, Zone 2, 6 story, 100x160 ft. apartment for 84 families, Hoover Ave. west of 138 St., $588,000; 6 story, 98x200 ft. apartment for 78 families, 84 Rd. and Smedley St., $546,000; 6 story, 85x200 ft. apartment, for 72 families 134 St. between Hoover and 82 Aves., $504,000; 6 story, 100x160 ft. apartment for 84 families, 135 St. between Hoover Ave. and 82 Dr., $588,000; 6 story, 80x200 ft. apartment for 84 families, 134 St. between Hoover and 83 Aves., $588,000; 6 story, 100x160 ft. apartment for 84 families, 138 St. between Hoover Ave. and 82 Dr., $588,000; 6 story, 85x300 ft. apartment for 126 families, 135 St. between Hoover and 83 Aves., $882,-000; 6 story, 88x200 ft. apartment for 72 families, 135 St. between Hoover Ave. and 82 Dr., $504,000.

▲ **N. Y., New York**—CLINIC—Roosevelt Hospital, 9 Ave. and 59 St., Zone 19, plans by York & Sawyer, 101 Park Ave., Zone 17, 5 story wing, to be called Tower Memorial Clinic bldg., 420-22 W. 59 St. $1,300,000.

▲ **N. Y., New York**—POST OFFICE—Webb & Knapp, Inc., 383 Madison Ave., Zone 17, plans by Frank S. Parker Assoc., 256 E. 49 St., Zone 17, 4 story post office, 346 W. 42 St. $1,500,000.

N. Y., Woodhaven—APARTMENT—Park Lane Terrace Apartments, c/o Morris Rothstein & Son, archt., 186 Joralemon St., Brooklyn, Zone 2, 6 story apartment, Park Lane South and 87 St. $625,000.

▲ **O., Cleveland**—SHOPPING CENTER—Euclid-Green Development Co., 810 Schofield Bldg., plans by George Howard Burrows, 1621 Lee Rd., L-shaped one and 2 story brick, steel, glass shopping center with 80 ft. tower, sidewalk canopies, Euclid Ave., opposite Green Rd. $2,500,000.

▲ **O., Garfield Heights**—APARTMENTS—Ecco Constr. Co., Parklawn and Euclid Aves., Euclid, plans by Weinberg & Teare, Schofield Bldg., Cleveland, 150 brick, block garden type apartments, 1,500 suites. $15,-000,000.

Pa., New Castle—HOSPITAL—Bd. Trustees New Castle Hospital, New Castle, hospital addn. $800,000.

▲ **Tex., El Paso**—DWELLINGS—Likins, Foster & Assoc., 121 S. Yale Ave., Albuquerque, N. M., 500 masonry exterior dwellings, concrete slab fdn., $5,450,-000, both on Carlsbad Hy., in Cielo Vista Park.

▲ **Wash., Bremerton**—HOUSES—Modern Home Builders, Inc., 3849 34 Ave. W., Seattle, 110 houses in View Ridge. $1,000,000.

▲ **Que., Sherbrooke**—COLLEGE—Seminary of St. Charles Borromee, 65 Marquette St., plans by J. A. & A. Poulin, 71 Prospect St., 4 story, 55x100 ft., and 5 story, 65x195 ft. rein.-con., brick, College addns. $1,000,000. CD 5/8/46.

INDUSTRIAL BUILDINGS

▲ **Ala., Birmingham**—COKE OVENS—Woodward Iron Co., Woodward St., 30 coke ovens, etc. $3,600,000.

▲ **Ala., Reform**—PLANT—Westinghouse Electric Co., First Natl. Bldg., Pittsburgh, Pa., light bulb plant, near here. $1,500,000.

▲ **Ark., Ozark**—GENERATING PLANT—Arkansas Electric Co-operative Corp., Ozark, steam generating plant, $10,558,000. CD 2/16/49.

Ill., Decatur—FREIGHT YARDS—Wabash R. R., Railway Bldg., St. Louis, Mo., freight yards expansion, bldgs. and rail, $950,000.

▲ **Ill., Riverdale**—PLANT—Acme Steel Co., Calumet River and Pennsylvania R.R., plant expansion, $1,-500,000.

▲ **Ia., Des Moines**—PLANT—Solar Aircraft Co., 18 and Grand Ave., plant addn. $1,000,000.

▲ **Neb., Hastings**—POWER PLANT—Central Nebraska Public Power & Irrigation Dist., Hastings, power plant, $2,270,000. G. E. Johnson, c/o owner, ch. engr.

▲ **N. J., Morris Twp.**—PLANT—Mennen Co., 345 Central Ave., Newark, N. J., plant on 90-acre tract. $2,500,000.

N. Y., Long Island City—WAREHOUSE—Sunshine Biscuits, Inc., Thomson Ave., plans by M. C. Haley, c/o owner, 1 story, 149x169 ft., warehouse, Thomson Ave. between 29 and 30 Sts. $250,000.

▲ **N. C., Fuquay Springs** — PLANT — Cornell-Dubilier Electric Corp., Hamilton Blvd., South Plainfield, N. J., electrical mfg. plant, Farmers Warehouse 1 and 2. $1,500,000.

▲ **O., Eastlake**—POWER STATION—Cleveland Electric Illuminating Co., Public Square, Cleveland, power station, 8 turbo-generators, 1,000x1,200 ft. high boiler stacks, steel, brick, masonry constr., $100,000,000. J. D. Hogg, purch. agt., 75 Public square, Cleveland 1, O., will handle construction details. CD 1/12.

▲ **O., McConnellsville**—POWER PLANT—Ohio Power Co. (subsidiary of American Gas & Electric Co.) 305 Cleveland Ave. S. W., Canton, 400,000 kv power plant on Muskingum River, 12 mi. south of here, $45,000,000.

▲ **O., Portsmouth**—FURNACE, etc.—Detroit Steel Co., 1025 Oakwood St., Detroit, Mich., 2nd blast furnace, 4 open hearth furnaces, blooming mill, hot strip mill and cold rolled steel mill. $50,000,000.

▲ **Okla., Sulphur**—POWER PLANT—Oklahoma Gas & Electric Co., 321 N. Harvey St., Oklahoma City, power plant, $8,500,000. Pioneer Service & Eng. Co., 231 S. La Salle St., Chicago 4, Ill., consult. engr. CD 1/24.

▲ **Pa., Reading**—STEEL MILL—Carpenter Steel Co., 101 W. Bern St., hot rolling steel mill. Approx. $3,000,000.

▲ **S. C., Bishopville**—PLANT—Reeves Bros., Inc., c/o Lockwood-Greene Engineers, archts., Montgomery Bldg., Spartanburg, textile plant, $2,000,000.

▲ **Tenn., Knoxville**—PLANT—Electro Manganese Co., Proctor St., chemical plant. $1,000,000.

▲ **Tex., Galveston**—COTTON COMPRESS, etc.—Southern Compress & Warehouse Co., 511 37 St., reconstruct cotton compress, $750,000; reconstruct Warehouse 5, $450,000.

▲ **Tex., Houston**—PLANT—Sheffield Steel Corp., Industrial Rd. (subsidiary of Armco Steel Corp., Commerce Bldg., Houston Texas-parent owner). seamless tubing mill, Approx. $20,000,000; mill for mfg. steel ingots and plates, $12,243,981; blooming mill expansion, $16,500,000; blast furnace, $12,500,000; open hearth furnace, $10,275,000.

▲ **Tex., Longview** — PLANT — Southwest Metals, c/o Julius D. Madaras, Longview, enlarging plant to produce 10,000 tons high grade electric steel ingots a month, $4,000,000.

▲ **Tex., Port Arthur**—PLANT—Koppers Co., Inc., Koppers Bldg., Pittsburgh, Pa., chemical plant. $6,500,-000.

▲ **Tex., Waco**—GENERATING STATION—Texas Power & Light Co., 915 Wood St., Dallas, 80,000 kw. steam-electric generating station. $4,500,000.

▲ **W. Va., Point Pleasant**—PLANT—Celanese Corp., c/o Point Pleasant Chamber of Commerce, Point Pleasant, mfg. plant. Approx. $1,000,000.

▲ **Wis., Milwaukee**—FACTORY—Inland Steel Products Co., 4101 W. Burnham St., Zone 14, 1 story, 400x800 ft., steel, concrete factory, West Milwaukee, $1,250,000, V. K. Boynton, 611 N. Broadway, Zone 2, consult. engr.

▲ **Alta., Edmonton**—PLANT—Canadian Chemical Co. Ltd., c/o Celanese Corp. of America, 180 Madison Ave., New York, N. Y., plant on 320 acre property, 7 mi. east of here. $40,000,000.

UNCLASSIFIED

▲ **Ill., Evanston**—FIELD HOUSE—Northwestern University, Evanston, plans by Holabird, Root & Burgee, 180 N. Wabash St., Chicago, Ill., steel, rein.-con. Field House (McCaw) $1,000,000.

Nebraska—RURAL DISTRIBUTION LINES—Norris Rural Public Power Dist., Beatrice, rural distr. lines, Gage Co. $555,000. P. L. Burns, Davenport Bank Bldg., Davenport, Ia., consult. engr. CD 7/13/49.

North Carolina—RURAL DISTRIBUTION LINES—Blue Ridge Electric Membership Corp., Lenoir, rural distr. lines and imprvs., Caldwell Co. $885,000. CD 10/30/46.

▲ **North Carolina**—RURAL DISTRIBUTION LINES—Four County Electric Membership Corp., Burgaw, rural distr. lines and imprvs., Pender Co. $2,185,000.

North Carolina—RURAL DISTRIBUTION LINES—Randolph Electric Membership Corp., Asheboro, rural distr. lines and imprvs., Randolph Co. $500,000. CD 8/25/49.

▲ **North Carolina** — TELEPHONE SYSTEM — Skyline Telephone Membership Corp., West Jefferson, telephone sys., rebuild 20 mi. existing lines, 781 mi. new lines, 6 new dial central offices, Ashe Co. $1,060,000.

▲ **Okla., McAlester** — COAL MINING — Armco Steel Corp., Commerce Bldg., Houston, Tex., cvonstruction and development coal-mining facilities. $4,000,000.

Texas—PIPE LINE—Gulf Oil Corp., Port Arthur, Tex., 8 in. 76 mi. welded joint gas pipe line for transporting gas to gulf coast chemical planets, $760,000; 6 in. 32 mi. gas pipe gathering lines, $175,000, city of Port Arthur, Jefferson Co.

▲ **Tex., Rusk** — MINING FACILITIES — Armco Steel Corp., Commerce Bldg., Houston, iron-ore mining facilities. $1,500,000.

▲ **Wisconsin**—STEAM GENERATING PLANT, etc.—Dairyland Power Co-Operative, La Crosse, Wis., 30,000 kw. unit at E. J. Stoneman Steam Generating Plant, Cassville, two 16,600 kw. units at Port Arthur, redeveloping hydro-electric plant, 88 miles transmission lines and 18 sub-stations, $5,440,000. CD 7/14/49.

CONSTRUCTION REPORTS-Second Section

NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
March 20
Massachusetts

BIDS ASKED—BUILDINGS

▲ **Mass., Woburn** — HOUSING — B.A. 3/9 — **City of** Woburn Housing Auth., 11 Winn St., 2 story, bsmnt. housing Proj. 19-1, $1,000,000. CD 4/3/50.

LOW BIDDERS—BUILDINGS

Olson & Appleby—222 Union St., New Bedford, Mass. Low Bidder. $542,727. Vocational High SCHOOL addn., alterations, Ash St., NEW BEDFORD, MASS. City, Supt. Bldgs., Municipal Bldg., New Bedford, Mass. Bids Feb. 8. CD 1/17.

M. Spinelli & Sons, Inc., 59 Milk St., Boston, Mass. Low Bidder. $572,000. Contr. 1, HOSPITAL for Walter E. Fernald State School Proj. 121, WAVERLY (BR. BOSTON), MASS. State, Dpt. Mental Health, 15 Ashburton Pl., Boston, Mass. Bids Feb. 8.

CONTRACTS—HEAVY CONSTRUCTION

A. Julian, 106 Bell St., Bridgeport, Conn. Contract Awarded. $567,227. Contr. 11, sewerage system, FAIRFIELD, CONN. Town, Town Hall, Fairfield, Conn. Bids Dec. 14, awarded Feb. 2. CD 1/31, under LB.

CONTRACTS—BUILDINGS

▲ **Tocci Bros. Constr. Co.**, 38 Colonial Ave., Newtonville, Mass. Contract Awarded. $1,081,130. 3 story, brick HIGH SCHOOL adn., alteration STOUGHTON, MASS. Town, Pearl St., Stoughton, Mass. CD 2/5, under LB.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
March 13
New Jersey
STREETS AND ROADS
March 7
New York

† **New Jersey and New York**—B.A. 3/7—U. S. Eng., 80 Lafayette St., New York, 13, N. Y., dredging **Perth Amboy Anchorage, New York and New Jersey Channels.**

BIDS ASKED—BUILDINGS

Pa., Embreeville—QUARTERS—B.A. 3/7—General State Auth., 18 and Herr Sts., Harrisburg, quarters for female employees at Embreeville State Hospital. $350,000. Plans deposit $10. Baader, Young & Schultze, 1500 Walnut St., Phila., Zone 2, engrs. and archts. CD 2/14, under LB.

Pa., Laurelton—BOILER PLANT—B.A. 3/7—General State Auth., 18 and Herr Sts., Harrisburg, boiler plant imprvs. at Laurelton State Village. $300,000. Plans deposit $10. Albert E. Peters, 216 N. 9 St., Scranton, Zone 4, engr. CD 6/12.

LOW BIDDERS—HEAVY CONSTRUCTION

▲ **Consolidated Constr. Co.**, 810 Haddon Ave., Collingswood, N. J. Low Bidder. $1,567,000. Secondary Sewage Treatment Plant, EASTON, PA. City, Easton, Pa. Bids Feb. 14. CD 1/12.

▲ **Tri-County Constructors**, Elkins Park, Pa. Low Bidder. $742,680. Contr. 1, structural steel for sewage disposal plant***Municipal Service Co., 908 Grand St., Kansas City, Mo., $352,440. Contr. 2, mechanical work for disposal plant, READING, PA. Wyomissing, Pa. Joint Municipal Auth., West Reading, Pa. Bids Feb. 14. CD 1/5.

LOW BIDDERS—BUILDINGS

I. A. Slutsky, Hunter, N. Y. Low Bidder. $654,527, general constr. SCHOOL addn., BOONVILLE, N. Y. Bd. Educ., Boonville, N. Y. Bids Feb. 14. CD 1/17.

▲ **Westmoreland Constr. Co.**, P.O. Box 32, Greensburg, Pa. Low Bidder, $1,455,000. 3 and 7 story, brick, steel frame HOSPITAL addn., GREENSBURG, PA. Westmoreland Hospital, Greensburg, Pa. Bids Feb. 1. CD 1/12.

▲ **North Versailles Twp. Auth.**, East McKeesport, Pa., rejected bids Jan. 31, 1 and 2 story, 270x349 ft. brick, block JUNIOR HIGH SCHOOL, North Versailles Twp. near McKEESPORT, PA. L. B. $868,000. CD 2/6, under LB.

CONTRACTS—HEAVY CONSTRUCTION

The Suburban Engineering Co., 15 W. 38 St., New York, N. Y., Contract Awarded. $679,535, Contr. A, of sewage disposal plant, pumping stations, intercepting sewers, etc., PORT WASHINGTON, N. Y. Bd. Sewer Comrs., Port Washington Sewer Dist., Main St., Port Washington, N. Y. Bids Jan. 4. CD 1/15, under LB.

Ware Laboratories, Inc., 3700 N. W. 25 St., Miami, Fla. Contract Awarded. Approx. $945,000. filtration plant and pump station, pumping station, filtration plant and equip., near GREENSBURG, PA. Municipal Auth. of Westmoreland Co., Greensburg, Pa. Laboon & Bankson, 1116 Berger Bldg., Pittsburgh, Pa. Bids Dec. 11. CD 11/21.

CONTRACTS—BUILDINGS

▲ **Mutual Constr. Corp.**, 205 E. 42 St., New York 17, N. Y., Contract Awarded. $1,013,400. HEALTH and PHYSICAL EDUCATION bldg., POTSDAM, N. Y. New York State Dormitory Auth., Albany, N. Y. Bids Jan. 3. CD 1/11, under LB.

William E. O'Neil Constr. Co., 200 Madison Ave., Syracuse, N. Y. Contract Awarded. $818,825, general constr. modern power and heating PLANT, Utica State Hospital, UTICA, N. Y. Bureau Contracts & Accounts, Albany, N. Y. Bids Jan. 10. CD 1/16, under LB.

▲ **Louis Bleznak**, 814 N. Broad St., Woodbury, N. J. Separate Contracts. $1,989,000. RESIDENTIAL DEVELOPMENT, Tract No. 3, DEPTFORD, N. J. Dante J. D'Anastasio, 1814 Federal St., Camden, N. J., archt.

Mariani & Himelfarb, 1623 Walnut St., Phila., Pa. Separate Contracts, $870,000 RESIDENTIAL DEVELOPMENT, Cottage St., etc.; $300,000, Rhawn and Fairfield Sts., PHILA., PA., S. Sherwin Rochlis, 5664 Diamond St., Phila., Pa., archt. for latter project.

I. Reindollar & Son, 35 N. George St., York, Pa. Contract Awarded. $997,000. 1 story, 150x240 ft. WAREHOUSE, 3 story 60x140 ft. OFFICE bldg., steel and aluminum siding constr., YORK, PA. Metropolitan Edison Co., 412 Washington St., Reading, Pa. Bids Jan. 31. CD 1/19.

▲† **Dpt. Navy**, Pub. Wks. Office Naval Gun Factory, Wash. 25, D. C. Owner Builds. $1,800,000. naval powder FACTORY, addnl. facilities, INDIAN HEAD, MD., Day & Zimmerman, 1700 Sansom St., Phila., Pa., engrs.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION--
STATE HIGHWAY LETTINGS
BRIDGES
March 21
Florida
Louisiana
STREETS AND ROADS
March 7 — Louisiana
March 8 — Virginia
March 21
Louisiana

† **North Carolina**—B.A. About 3/7—U. S. Eng., foot of Front St., Norfolk, Va.,

Vance Co.—relocation N.C. 39 at Crookes Run and Flat Creek, Buggs Island Reservoir Proj. Eng. 44-110-51-32. Plans deposit $20. CD 8/3/44, under Earthwork, Waterways, Virginia and North Carolina.

Va., Vinton—B.A. 3/7—Town, sewage treatment plant, sewers, pump. station, etc. $300,000. Plans deposit $15. R. Stuart Royer & Assoc., Virginia Bldg., Richmond, engrs.

BIDS ASKED—BUILDINGS

Va., Charlottesville—POWER PLANT—B.A. 3/6—State of Virginia, Richmond power plant apparatus and piping and insulation, at University of Virginia. Approx. $600,000. Plans deposit $5. Wiley & Wilson, American Bldg., Richmond, engrs. CD 10/11/44.

LOW BIDDERS—HEAVY CONSTRUCTION

▲ † **Hooper Constr. Co.**, Coral Gables, Fla., Low Bidder. $1,270,862, about 15 mi. Levees L-37 and L-33 of Central and South Florida Flood Control Proj., Dade and Broward Counties, CIVENG-08-123-51-32. FLORIDA, U. S. Eng., P. O. Box 4970, Jacksonville, Fla. Bids Feb. 15. CD 1/16.

LOW BIDDERS—BUILDINGS

Graham Bros., Southern States Bldg., Richmond, Va. Low Bidder. $868,500. 3 story colonial type DORMITORY at College of William & Mary and 2 other bldgs., WILLIAMSBURG, VA. State of Virginia, Richmond, Va. Bids Feb. 16. CD 1/11.

▲ **J. A. Jones Constr. Co.**, Aero Dr., Shreveport, La. Low Bidder. $2,037,000. 7 story NURSING SCHOOL, SHREVEPORT, LA. State Div. Admin., Shreveport, La. Bids Feb. 14. CD 1/16.

CONTRACTS—HEAVY CONSTRUCTION

▲ **Birgingham Bldg. Co.**, 909 7 Ave. S., Birmingham, Ala. Contract Awarded, $1,397,000, natural gas sys., TOCCOA, GA., City, Toccoa, Ga.

CONTRACTS—BUILDINGS

▲ **C. M. Guest & Sons**, Anderson, S. C. Contract Awarded, $3,000,000, PLANT (nylon hosiery industry), ANDREWS, N. C. Berkshire Knitting Mills, Wyomissing St., Reading, Pa.

▲ **Kaiser Aluminum & Chemical Corp.**, Airline Hy., Baton Rouge, La. Own Forces. Approx. $3,000,000, aluminum PLANT, BATON ROUGE, LA. CD 1/5.

▲ **T. Miller & Son**, Box 921, Lake Charles, La. Contract Awarded, $1,639,562, 100 bed memorial HOSPITAL, LAKE CHARLES, LA. Lake Charles Memorial Hospital Assn., Commerce Bldg., Lake Charles, La. Awarded Feb. 15. CD 2/7, under LB.

▲ **Kaiser Aluminum & Chemical Corp.**, Airline Hy., Baton Rouge, La. Owner will design and construct. $75,000,000. 200,000,000 lb. per year capacity aluminum reduction PLANT and power facilities, NEW ORLEANS, LA. CD 2/20.

▲ **Raven Constr. Co.**, Starks Bldg., Louisville, Ky. Separate Contracts, $2,400,000, 200 RESIDENCES on subdivision Bashford Manor Farm, LOUISVILLE, KY. Awarded Feb. 7.

▲ **E. I. du Pont de Nemours & Co., Inc.**, du Pont Bldg., Wilmington, Del. Own Forces, hydrogen peroxide PLANT, Fite St. and Hy. 51, MEMPHIS, TENN.

▲† **Robert E. Maxey Constr. Co.**, Lubbock, Tex. Contract Awarded, $2,500,000, ADMINISTRATION-ENGINEERING bldg. at Arnold Engineering Development Center, TULLAHOMA, TENN. U. S. Eng., Tullahoma, Tenn. Bids Jan. 16. CD 1/31, under LB.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
STREETS AND ROADS
March 6
Wisconsin

O., Fostoria—B.A. 3/7—City, rehabilitate sewage treatment plant (1) trunk sewer and (2) addns., rehabilitation sewage treatment plant. $650,000. CD 2/20/46.

O., Fremont—B.A. 3/8—City, City Hall, WW, dam, filtration works, water mains. $750,000. Consoer, Townsend & Assoc., 351 E. Ohio St., Chicago 11, Ill., engrs. CD 1/3, under LB.

BIDS ASKED—BUILDINGS

Ill., Litchfield—SCHOOL—B.A. 3/7—Litchfield Bd. Educ., Litchfield, brick, concrete high school addn. $500,000. S. T. Pabst & Assocs., Goldman Bldg., East St. Louis, archts. CD 9/27.

▲ **Ill., Chicago**—APARTMENT—Bids Asked—John Mack, c/o Shaw, Metz & Dolio, 208 S. LaSalle St., Zone 4, 21 story, 57x167 ft., 286 unit apartment, Sheridan Rd. and Briar St. $2,750,000.

LOW BIDDERS—HEAVY CONSTRUCTION

▲ **Chas J. Wilson Co.**, 7601-07 S. Wentworth Ave., Chicago, 20, Ill. Low Bidder, $249,697. Grading 0.61 mi. Ill. Route 122, Chicago, Cook Co.***Bridges Paving Co., 1411 Central Industrial Dr., St. Louis, Mo., $357,318, bit resurf. 15.31 mi. U. S. Route 45, Gallatin, White and Saline Counties***S. J. Groves & Sons Co., 505 N. MacArthur Blvd., Springfield, Ill., $435,835, c. conc. wid'n. and c. conc. pavement 9.26 mi. U. S. 45, Saline White and Gallatin Counties***McCann & Co., 532 Reisch Bldg., Springfield, Ill., $87,877, crushed stone, grav. surf. course 3.95 mi. Ill. Rte. 642, Shelby Co.***R. A. Cullman & Co., Tremont, Ill., $187,994, bit. resurf. 8.1 mi. U. S. Route 24, Tazewell Co.***McCalman Constr. Co., 619 Section St., Danville, Ill., $619,615, c. conc. 1.39 mi. Ill. Route 10, Vermilion Co.***Trinidad Asphalt Mfg. Co., 4030 Choteau Ave., St. Louis, 10, Mo., $314,780, bit. resurf. 14.77 mi. U. S. Route 45, White Co.*** Jefferson Asphalt Co., 1209 Casey Ave., Mt. Vernon, Ill., $300,578, bit. resurf. 14.15 mi. Ill. Route 1 and U. S. Rte. 560, White Co.***Rockford Black Top Constr. Co., 1615 Westchester Dr., Rockford, Ill., $249,566, bit. on grav. or crushed stone surf. course 12.56 mi. Ill. Route 87, Whiteside and Ogle Counties, ILLINOIS. State Div. Hys., State Capitol, Springfield, Ill. Bids Feb. 16. CD 1/31.

▲ **John J. Tully Constr. Co.**, 33 N. LaSalle St., Chicago, 2, Ill. Low Bidder, $1,600,415. Main drain for Congress St. Superhighway from Ashland Blvd. to Sacramento St., also construction tunnel, CHICAGO, ILL. City, City Hall, Chicago, 2, Ill. Bids Feb. 8. CD 2/22.

CONTRACTS—BUILDINGS

▲ **C. W. Sharp & Sons**, 1710 Park Pl., Dayton, O. Owner Builds. $2,628,000. 240 HOMES on 50 acre tract south of W. Hillcrest Ave. and east of N. Gettysburg Ave., DAYTON, O.

▲ **Sumner S. Sollitt Co.**, 307 N. Michigan Ave., Chicago, Ill. Contract Awarded, Approx. $4,000,000, 12 to 20 story, 144x150 ft., stone, brick, rein.-con., structural steel, STORE and OFFICE, air-conditioned, 4 and Main Sts., EVANSVILLE, IND. Company, c/o Industrial Equities, Inc., 141 W. Jackson Blvd., Chicago, Ill.

▲ **Carl Geupel Constr. Co.**, 1919 N. Meridian St., Indianapolis, 2 Ind., Contract Awarded, Approx. $1,300,000. 5 story, U-shaped, brick, stone, rein.-con. OFFICE (center for 16 charity organizations) INDIANAPOLIS, IND. W. C. English Foundation, Jos. J. Daniels, pres., Fletcher Trust Bldg., Indianapolis, 4, Ind. Burns & James, 824 Archts. & Builders Bldg., Indianapolis, Ind., archts. Awarded Feb. 15.

▲† **Gust K. Newburg Constr. Co.**, 2040 N. Ashland Ave., Chicago, Ill. Contract Awarded, $4,601,000, 3,696,000 cu. ft. rein.-con., brick, stone regional OFFICE and CLINIC No. 11 for West Side, CHICAGO, ILL. Veterans Admin., Munitions Bldg., Wash., 25, D. C. Bids Jan. 16. CD 1/22, under LB.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

† **South Dakota and North Dakota**—B.A. 3/7—U. S. Eng., 1709 Jackson St., Omaha, Neb., transformers for Fort Randall Dam, S. D., and for Garrison Dam, N. D., Inv. 74. CD 6/1/44, under North Dakota.

† **Colorado**—TRANSMISSION LINE—B.A. 3/8—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver, Colo.,

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constr. Salida-Gunnison 115-kilovolt transmission line, Colorado-Big Thompson Proj. between Salida and Gunnison, Spec. DC-3314. Extended date. CD 1117.

† **Colorado**—B.A. 3/8—Bureau Reclamation, Dpt. Interior, Loveland, constr. Flatiron Power and Pumping Plant and afterbay dam, Estes Park-Foothills Power Aqueduct, approx. 9 mi. west of Loveland, Spec. DC-3306.

† **Nebraska**—B.A. 3/8—Bureau Reclamation, Dpt. Interior, Bldg 1-A, Denver Federal Center, Denver, Colo., furnishing three 42x30 ft. radial gates and 3 counterweight frames for Missouri River Basin Proj., Inv. No. DS-3321.

Tex., Abilene—B.A. 3/9—City, Austin P. Hancock, mgr., Abilene, Clear Fork Channel Dam and pump. station. $300,000. Plans deposit $50. Freese & Nichols, 407 Danciger Bldg., Fort Worth, engrs. CD 1/28/49.

North Dakota — RURAL DISTRIBUTION LINES — B.A. 3/14—K E M Electric Co-operative, Linton, 525 mi. rural distr. lines and 26.43 mi. conversion, Emmons, Logan and McIntosh Counties. Extended date. Ulteig Eng. Corp., 1114½ Front St., Fargo, engrs. CD 2/15.

BIDS ASKED—BUILDINGS

▲ **Kan., Neodesha** — REFINERY — B.A. After 3/1 — Standard Oil Co. of Indiana, 910 S. Michigan Ave., Chicago, Ill., refinery. $2,500,000. CD 12/26.

Tex., Ennis—HOUSING—B.A. 3/10—Ennis Housing Auth., 40 low cost housing units (negroes), $400,000; 50 low cost housing units (whites), $425,000, Bentley, Broad & Nelson, 228 Reserve Loan Life Bldg., Dallas, engrs. CD 11/10.

Tex., Midland—OFFICE—Bids Asked—Humble Oil & Refining Co., Humble Bldg., Houston, 4 story bsmnt. office. $850,000. George & Abel B. Pierce, 4511 Kyle St., Houston, archts. CD 10/27.

LOW BIDDERS—HEAVY CONSTRUCTION

▲† **Guy H. James Constr. Co.**, 1st Natl. Bldg., Oklahoma City, Okla. Low Bidder. **$2,787,665** substructure***American Bridge Co.**, 629 S. E. 2 St., Minneapolis, Minn., **$2,817,612**, superstructure for Omaha Railroad Bridge over Missouri River, Fort Randall Dam Project, Inv. 71, near Chamberlain, SOUTH DAKOTA. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Feb. 14. CD 1/11.

▲† **Bureau Reclamation**, Dpt. Interior, P. O. Box 1627, Great Falls, Mont. rejected bids Dec. 21, 82 mi. 115,-000 volt power line transmission line from point 17 mi. east of Helena to existing line near Great Falls, Lewis & Clark and Cascade Counties, Great Falls, Missouri River Basin Proj. Spec. DC 3248, MONTANA, L. B. $1,231,162. Project abandoned. CD 1/3, under LB.

LOW BIDDERS—BUILDINGS

Noyes Constr. Co., Fergus Falls, Minn. Low Bidder. $821,000. new grade SCHOOL, Lafayette Grade SCHOOL addn., Industrial Arts SCHOOL, WILLMAR, MINN. Bd. Educ., Alice C. Hedin, clk., Willmar, Minn. Bids Feb. 7. CD 1/4.

CONTRACTS—HEAVY CONSTRUCTION

▲ **Chicago, Rock Island & Pacific R.R. Co.**, W. B. Throckmorton, ch. engr., La Salle St. Station, Chicago, 5, Ill. Owner Builds. **$6,000,000.** constr. new main lines incl. grading down high road bed, elimination of curves, new rails, etc., from Atlantic to Council Bluffs, IOWA.

▲ **West Texas Gulf Pipe Line Corp.** (Gulf Oil Co., Standard Oil of Ohio, Pure Oil Co., Cities Service Co). Gulf Bldg., Houston, Tex. Own Forces. Approx. **$13,750,000.** 300 mi. 12 in. welded joint crude oil line from Colorado City to Wortham. Approx. **$7,750,000,** 160 mi. welded joint crude oil pipe line between Wortham and Sour Lake. Approx. **$3,850,000,** approx. 110 mi. 18 in. welded joint crude oil pipe line between Wortham and Longview, TEXAS. Grand total $25,-350,000. CD 2/5.

CONTRACTS—BUILDINGS

▲ **Alexander & Kingbay**, 4641 Hiawatha Ave., Minneapolis, Minn. Contract Awarded. Approx **$1,000,000.** general constr. eight 2½ story bldgs., 92 APARTMENTS with air-raid shelter and underground garage between Chowed and Drew Aves. South and 44 and 54 Sts., MINNEAPOLIS, MINN. Westgate Apartments, c/o contractor, P. Crosier & Son, 2441 Lindale Ave. S., Minneapolis, Minn., archts.

▲ **Schweiger Constr. Co.**, 1525 Michigan St., Kansas City 1, Mo. Contract Awarded, admin. and production control unit, heat treating plant, wire mill loading docks, truck ramps, fuel oil storage unit, wet wire drawing PLANT; altering bldg. for mill and pickling and cleaning house, by company forces, KANSAS CITY, MO. Union Wire Rope Corp., 21 and Manchester Sts., Kansas City 3, Mo. Total cost, **$2,000,000.** Neville, Sharp & Simon, Midland Bldg., Kansas City 6, Mo., archts.

▲ **United Engineers & Constructors, Inc.**, 1401 Arch St., Phila., Pa. Contract Awarded. Total est. **$20,000,-000.** general constr. rein.-con., steel steam power generating (Meramec) PLANT near junction of Mississippi and Meramec Rivers at southeastern end of St. Louis Co., ST. LOUIS CO., MO. Union Electric Co. of Missouri, 315 N. 12 Blvd., St. Louis 1, Mo.

P. M. Constr. Co., 160 Avery St., Dallas, Tex. Contract Awarded. **$888,881,** est. $885,000. 114 DWELLING units for total 45 bldgs., brick, hollow tile walls, concrete slab fdn. CORSICANA, TEX. Corsicana Housing Auth., Corsicana. Bids Jan. 30, Awarded Feb. 5. CD 2/6, under LB.

▲ **Brown & Root, Inc.**, Box 3, Houston, Tex. Contract Awarded. Approx. **$65,000,000.** steel production PLANT, DAINGERFIELD, TEX. Lone Star Steel Co., E. B. Germany, pres., 4152 Mockingbird Lane, Dallas, Tex. CD 2/7, under LB.

▲ **Likins, Foster & Assoc.**, 121 S. Yale Ave., Albuquerque, N. M. Owner Builds. Approx. **$5,450,000.** 500 DWELLINGS, EL PASO, TEX. CD 2/13.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION

† **Wash., Seattle**—PIER—B.A. 3/8—P. Wks. Officer, Thirteenth Naval Dist., 1611 W. Wheeler St., major reconstruction Pier 91 involving 112,000 lin. ft. new piling, Spec. 26593. Plans deposit $20.

Calif., Los Angeles—B.A. 3/13—Los Angeles Co. Flood Control, 751 S. Figueroa St., construct Dominguez Channel, Inglewood, $100,000; Cooks Canyon Channel and debris Dam, $200,000. CD 8/20/45.

Oregon—HATCHERY IMPRVS.—B.A. 3/13—Oregon Fish Comn., Governor Bldg., Portland, Ore., imprvs. at Big Creek Hatchery south of Knappa Junction, Clatsop Co. Plans deposit $25; fish hatchery on Sandy River, Multnomah Co; Plans deposit $50. Arnie J. Soumela, Governor Bldg., Portland, Ore., engr.

† **California**—B.A. 3/15—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Santa Barbara, Calif., butterfly valve with operating mechanism, control system and accessories, for outlet works at Lauro Dam, Cachuma Proj., Spec. DS-3322. L. N. McClellan, ch. engr.

† **California**—B.A. 3/15—Bureau Reclamation, Dpt. Interior, Goleta, Calif., Lauro Dam, Cachuma Proj., Spec. DC-3320.

▲† **California**—B.A. 3/15—U. S. Eng., 751 S. Figueroa St., Los Angeles, Los Angeles River imprvt. Imperial Hy. to P. E. Railway Bridge, Hollydale, CIVENG 04-353-51-20. $2,000,000. CD 2/14.

BIDS ASKED—BUILDINGS

† **Utah, Tooele**—BUILDINGS—B.A. About 3/8—U. S. Eng., 10 West 1st South St., Salt Lake City, Zone 1, 11 bldgs. at Dugway Proving Ground, Inv. No. Eng. 04-203-51-1057. Plans deposit $60.

† **Utah, Tooele**—BUILDINGS, etc.—B.A. About 3/8—U. S. Eng., 10 W. First South St., Salt Lake City, Zone 1, construction Area "A", buildings and utilities at Dugway Proving Ground, Inv. No. Eng. 04-203-51-1059. Plans deposit $50.

† **Utah, Tooele**—BUILDINGS, etc.—B.A. About 3/8—U. S. Eng., 10 West 1st South St., Salt Lake City, Zone 1, construction of Area "B" buildings, utilities at Dugway Proving Ground, Inv. No. Eng 04-203-51-1060. Plans deposit $50.

Calif., Berkeley—SCHOOL—B.A. 3/8—Bd. Educ., Rose and Walnut Sts., Burbank Junior High School. $700,-000. Plans deposit $40. Miller & Warnecke, 507 Howard St., San Francisco, archts. CD 11/9, under LB.

Calif., Sacramento—GARAGE—B.A. 3/13—Div. Architecture, P. Wks. Bldg., 4 story, 206,000 sq. ft., rein.-con. garage for Dpt. Finance. Plans deposit $75. CD 10/11/49.

Wash., Kennewick—HOSPITAL—B.A. 3/14—Kennewick Public Hospital Dist., Richmond Bldg., hospital, $500,000. Plans deposit $25. Whitehouse & Price, Hutton Bldg. Spokane, archts. CD 11/15.

Calif., Berkeley—SCHOOL—B.A. 3/15—Berkeley Unified School Dist., Thomas L. Nelson, supt. Schools, Rose and Walnut Sts., Junior High School addns. Keller & Gannon, 126 Post St., San Francisco, mech. and elec. engrs. Blanchard, Maher & Paulus, 369 Pine St., San Francisco, archts. CD 11/17/48.

Calif., Long Beach—GYMNASIUM—B.A. 3/15—Long Beach City School Dist., 715 Locust Ave., 2 rein.-con. gymnasium bldgs. at Polytechnic High School. Approx. $300,000. Plans deposit $50. H. R. Davies, Security Bldg., Long Beach, archt. CD 2/10/50.

LOW BIDDERS—BUILDINGS

Sherman H. Johnson, 13029 E. Weaver st., El Monte, Calif., Low Bidder, **$521,619,** 33,000 sq. ft., frame, stucco Julia B. Morrison SCHOOL, NORWALK, CALIF. Norwalk School Dist., 12110 E. Walnut St., Norwalk, Calif. Bids Feb. 13.

CONTRACTS—HEAVY CONSTRUCTION

▲† **Baldwin-Lima-Hamilton Corp.**, Chester Pk. and Simpson St., Eddystone, Pa. Contract Awarded. **$3,009,759,** three 19,600-hp. hydraulic turbines for Albeni Falls dam, Priest River, Inv. No. 51-29, IDAHO. U. S. Eng., 4735 E. Marginal Way, Seattle, 4, Wash. Bids Jan. 31. CD 2/6, under LB.

Tom Lillebo, Reedsport, Ore. Contract Awarded. **$553,-789,** 965 ft. rein.-con., steel bridge over Coos River, Coos River Hy., Coos Co., OREGON. State Hy. Comn., State Office Bldg., Salem. Bids Jan. 24, awarded Feb. 9. CD 1/30, under LB.

▲ **J. E. Haddock Ltd.**, 3538 E. Foothill Blvd., Pasadena, Calif. Contract Awarded. **$1,769,134,** grading, paving, 4 bridges, etc., 1.5 mi. Ramona Freeway, Los Angeles, Los Angeles Co., CALIFORNIA. State Div. Hys., 120 S. Spring St., Los Angeles, Calif. Bids Feb. 1, awarded Feb. 13. CD 2/6, under LB.

† **American Pipe & Steel Corp.**, 2201 W. Commonwealth Ave., Alhambra, Calif., Contract Awarded. **$648,176,** furnish, install welded steel plate tanks, underground for various navy stations, MOFFETT FIELD, CALIF. Bureau Yards & Docks Annex, Navy Dpt., Arlington, Va.

CONTRACTS—BUILDINGS

▲ **Utah Constr. Co.**, 57 E. 4 South St., Salt Lake City, Utah. Contract Awarded. Approx. **$1,000,000.** industrial PLANT for mfg. machinery parts, tank heads, boiler heads, water heaters and coolers, contract

stampings, etc., SALT LAKE CITY, UTAH. Commercial Shearing & Stamping Co., 1775 Logan Ave., Youngstown, O. C. A. McMillan, c/o owner, engr. CD 2/19.

▲ **McNeil Constr. Co.,** 5860 Avalon Blvd., Los Angeles, Calif. Contract Awarded. **$2,000,000.** 1,200 tons daily capacity manganese mill on shore of Lake Mead, north of HENDERSON, NEV. Manganese Inc., Henderson, Nev. Southwestern Eng. Co., 4800 S. Santa Fe Ave., Los Angeles, Calif., engr.

† **John H. Sellen Constr. Co.,** 228 9 Ave. N., Seattle, Wash. Contract Awarded. **$687,476,** seven 8-family two type family QUARTERS and one 6-family row type quarters, incl. utilities and lighting, etc. Serial No. ENG 45-108-51-95, FORT LEWIS, WASH. U. S. Eng., 4735 E. Marginal Way, Seattle, 4, Wash. Bids Feb. 6. CD 2/12, under LB.

▲† **L. H. Hoffman,** 715 S. W. Columbia St., Portland, Ore. Contract Awarded. **$2,473,000.** 8 buildings for hot semiworks at Hanford Works, RICHLAND, WASH. General Electric Co., prime contractor for Atomic Energy Comn., for operation at Hanford Works, Richland, Wash. Bids Jan. 4. CD 1/10, under LB.

Moore & Roberts, Inc., 693 Mission St., San Francisco, Calif. Contract Awarded. **$507,898.** constr. SEGREGATION UNIT, FOLSOM STATE PRISON, FOLSOM, CALIF. State Div. Architecture, P. Wks. Bldg., Sacramento, Calif. Bids Jan. 30, awarded Feb. 5. CD 2/6, under LB.

Cecil Constr. Co., 27 S. Robertson St., Los Angeles, Calif., Contract Awarded, **$614,860,** 78 frame, stucco DWELLINGS Foster Rd. and Belcher St., NORWALK, CALIF. Residential Homes Co. Ltd., 227 S. Robertson St., Los Angeles, Calif. A. Arany 227 S. Robertson St., Los Angeles, Calif., archts.

▲ **Rose Pass Corp.,** 945 N. La Cienga Blvd., Los Angeles, Calif., Owner Builds, **$1,628,990,** 248 stucco DWELLINGS, Abbotsford Rd., Bequette Ave., Call St., etc. RIVERA, CALIF.

Biltmore Homes, 9434 Long Beach Blvd., South Gate, Calif., Owner Builds, **$829,250,** 97 stucco DWELLINGS, Cercita Dr., Anata Ave., Bonavista Lane, WHITTIER, CALIF. Southwest Drafting Service, 2724 Florence Ave., Los Angeles, Calif., archts.

CANADA

BIDS ASKED—HEAVY CONSTRUCTION

▲ **B. C., Vancouver**—B.A. 3/8—Chief Commissioner, Greater Vancouver Water Bd., 500 Beatty St., Vancouver, concrete gravity type dam 640 ft. long at crest and 325 ft. high straight spillway section, for supply of drinking water, North Vancouver. $6,600,000. Plans deposit $100. John L. Savage, Denver, Colo. engr. CD 12/11.

Ont., Toronto—B.A. 3/12—H. A. Hall, clk., York Twp., 2700 Eglinton Ave., sewage disposal plant alterations addns., new work incl. aeration tanks, final settling tank and new intake, Rockcliffe Blvd. Approx. $774,000. Plans deposit $50. O. M. Falls, c/o owner, engr. CD 2/9.

BIDS ASKED—BUILDINGS

▲ **Ont., Sarnia**—REFINERY DEVELOPMENT—B.A. 3/8—Imperial Oil Ltd., 56 Church St., Toronto, refinery development, constr. 46,500 barrel-a-day atmospheric and vacuum distillation unit, 23,250 barrel-a-day fluid catalytic cracking unit and light ends recovery plant. Total cost $25,000,000. CD 11/17.

Ont., Toronto—SCHOOL—B.A. 3/8—Etobicoke Bd. Educ., Montgomery Rd., Islington, high school addn. $850,000. Plans deposit $50. Page & Steele, 72 St. Clair Ave. W., archts. CD 11/10

▲ **Ont., Hamilton**—HOSPITAL—B.A. 3/9—City, Lloyd D. Jackson mayor, City Hall, new 4 and 5 story, 42x419 ft., wing Y-shaped for Henderson Convalescent Hospital, $2,700,000 L. H. Schwindt & Co., 37 King William St., and C. C. Parker, 63 John St., engrs. J. D. Kyles, 36 James St. S., archt. Extended date. CD 2/9.

▲ **Ont., St. Catherines**—HOSPITAL WINGS, etc.—B.A. 3/12—St. Catherines General Hospital, St. Catherines, new hospital wing and connecting links to hospital, $2,000,000. Plans deposit $100. Extended date. Govan, Ferguson, Lindsay, Kaminker, Maw, Langley & Keeleyside, 415 Jarvis St., Toronto, and Robert Ian Macbeth, 104 Queen St., archts. CD 2/9.

Ont., Smith Falls—COLLEGIATE INSTITUTE—B.A. 3/12—J. W. McCue, secy. Bd. Educ., Smith Falls, 2 story, bsmnt., 158x274 ft., collegiate institute. Approx. $600,000. Plans deposit $50. H. H. Roberts, Westport, archt. CD 3/30.

CONTRACTS—HEAVY CONSTRUCTION

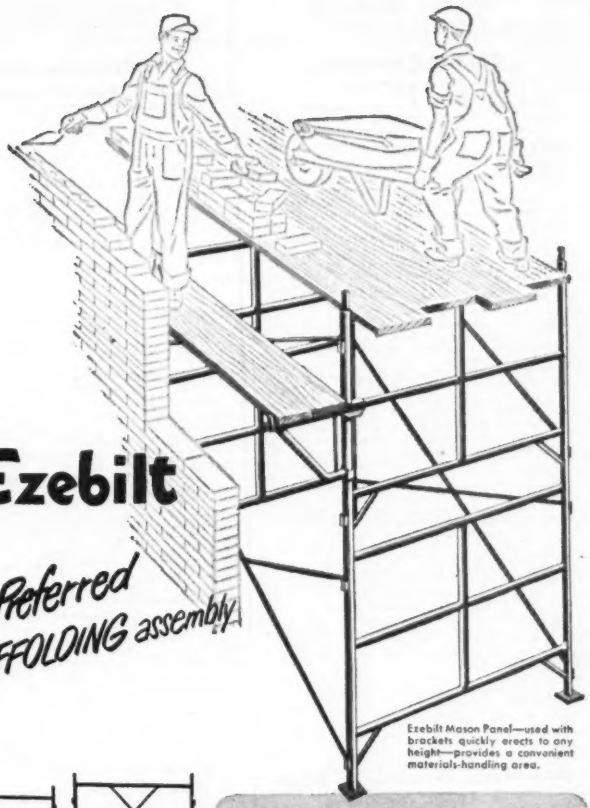
▲ **H. J. McFarland Constr. Co.,** Elizabeth St., Picton, Ont. Contract Awarded. Approx. **$1,000,000,** first-stage airport development 2 new runways and taxi strips, Uplands Airport, OTTAWA, ONT. Dpt. Transport, Hunter Bldg., Ottawa, Ont. Bids Feb. 6. CD 11/29.

CONTRACTS—BUILDINGS

M. Sullivan & Son Ltd., 234 Elgin St., Arnprior, Ont. Contract Awarded. Approx. **$900,000,** BARRACK BLOCK, mess and workshop at Army Station, PETAWAWA, ONT. Defence Constr. Ltd., 395 Fleet St., Toronto, Ont. Bids Dec. 6. CD 11/16.

A. Bianchi & Son, 7415 Quebec Ave., Outremont, Que. Owner Builds. **$750,000,** 28x36 ft., concrete, block, stucco bungalow type DWELLINGS, Persilliers St., MONTREAL, QUE. P. Colangelo, 3710 Ste. Catherine Rd., Montreal, Que., archt.

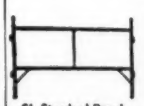
(Proposal Advertisements see pp. 68 & 69)



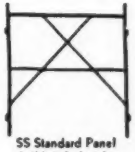
Ezebilt

The Preferred SCAFFOLDING assembly

Ezebilt Mason Panel—used with brackets quickly erects to any height—provides a convenient materials-handling area.

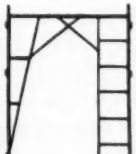


SL Standard Panel
2½-3 ft. heights



SS Standard Panel
4-4½-5 ft. heights

SU Mason Panel
4-4½-5 ft. heights



SH Ladder Panel
6½ ft. high

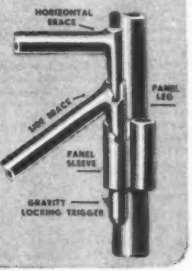
PSW Putlogs—up to
22¼ ft. span

Above are sketched just a few of the many basic Ezebilt parts—all interchangeable—all assembled with no bolts, no wing nuts, no loose parts.

"Up Faster—no bolts to master"

To erect a scaffolding without losing time working with or looking for loose parts—specify Universal Ezebilt. Everything necessary for assembling the different panels, stringers, and braces is contained right in the "Gravity Lock"... just put the units into position and the scaffolding virtually assembles itself.

Note in the Diagram how easy and fast an Ezebilt installation can be made. In the simple "Gravity Lock" design, the side braces and horizontal braces are attached to the panel legs . . . no nuts, bolts, or tools required.



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UNIVERSAL MANUFACTURING CORP.
200 NORTH STREET · ZELIENOPLE (Pgh. District) PA.

EZEBILT Tubular Steel-Panel Scaffolding, LADSCAF Lightweight Scaffolding, Elevating Towers, Rolling Maintenance Towers, Portable Steel Bleachers, Agricultural Equipment, Endok Clamp-Type Scaffolding.

OFFICIAL PROPOSALS

Bids: March 27, 1951 (353)

Electrical Equipment

CONTRACT 426

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York City, until 11:00 A.M., Eeastern Standard Time, on Tuesday, March 27, 1951, for Contract 426, for furnishing, installing and testing electrical equipment and conductors and for installing and testing substation equipment furnished by The City and for testing electrical equipment installed under previous contracts, for the sewage treatment plant and for the North Street and Neversink pumping stations which are being built under Contract 381 by The City of New York in the City of Port Jervis, Orange county, New York, all as set forth in the specifications.

No bid will be received and deposited unless accompanied by a certified check upon a National or State bank, drawn and made payable to the order of the Comptroller of the City of New York, in the amount of two thousand dollars ($2000.00), for the proper execution of the contract.

At the above place and time the bids will be publicly opened and read. Pamphlets containing information for bidders, forms of bid and contract, specifications, contract drawings, requirements as to surety, etc., can be obtained at the office of the Chief Engineer, Room 1311, at the above address, upon application in person or by mail, by depositing the sum of five dollars ($5.00) in cash or its equivalent for each pamphlet. Within 30 days following the award of contract or rejection of bids, the full amount of such deposit will be refunded for each pamphlet submitted as a bid and a refund of four dollars ($4.00) will be made for each other pamphlet returned in acceptable condition. Arrangements will be made whereby prospective bidders desiring blueprints of the contract drawings for their own use may secure same, the cost thereof to be paid by them. For further particulars, apply at the office of the Chief Engineer at the above address.

IRVING V. A. HUIE, President, RUFUS E. McGAHEN, JAMES J. MORAN, Commissioners, Board of Water Supply; RICHARD H. BURKE, Secretary.

Bids: March 14, 1951 (352)

Raw Water Transmission Main & Appurtenances

CITY OF NORFOLK, VIRGINIA

Proposals will be received by the Department of Public Works, Room 203, City Hall, Norfolk, Virginia, for Furnishing and Installing Raw Water Transmission Main and Appurtenances, until 12 noon, E.S.T. March 14, 1951, at which time and place they will be publicly opened and read.

Bids shall be enclosed in two envelopes. The inner envelop shall be endorsed "Bids for Transmission Main, Contract No. 9," and shall also be marked with the name of the company and the Virginia contractor's license number. The outer envelope shall be addressed to the Department of Public Works.

The work embraces the furnishing and installation of approximately 79,000 linear feet of pipe, including two river crossings. For the river crossings, 42-inch C. I. pipe will be laid. Flexible joint piping to be laid for the submerged portions and bell and spigot joints will be laid on the marshes. Bids will be taken on cylinder reinforced concrete pressure pipe 48-inches in diameter. Valves, valve vaults, and appurtenances are included.

Each bid shall be accompanied by a certified check in the amount of Fifty Thousand Dollars ($50,000.00) made payable to Alex H. Bell, Treasurer of the City of Norfolk, Virginia.

Drawings and Specifications may be obtained from the Office of the Department of Public Works of the City of Norfolk, Virginia, upon deposit of Twenty-five Dollars ($25.00) for each set of drawings and specifications, which deposit will be returned upon return of the plans and specifications, in good condition.

The Department of Public Works reserves the right to reject any or all bids and to accept the bid which in its opinion best serves the interests of the City.

H. H. George, 3rd,
Director of Public Works

OFFICIAL PROPOSALS

Bids: March 13, 1951 (344)

Construction of Parkway

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner for:

ROUTE 4 PARKWAY, SECTION 21A
Construction of Route 4 Parkway, Section 21A, Bridges and Approaches at Magnolia Avenue; Toms River; C.R.R. of N. J.; Lakehurst Road and Route 37, Townships of Berkeley and Dover, Ocean County.

Roadway Items

Estimated:
30,500 cu. yds. Roadway Excavation-Earth
67,000 cu. yds. Borrow Excavation
Bridge Items
12,650 cu. yds. Concrete in Structures
590,305 lbs. Reinforcement Steel in Structures
823,285 lbs. Structural Steel
14,400 lin. ft. Timber Piles

Bids for the above will be received at the office of the State Highway Department, Assembly Room, Room 140, in the State Highway Office Building, 1035 Parkway Avenue, Trenton, New Jersey, on Tuesday, March 13, 1951, at eleven o'clock (11:00 A.M.—EASTERN STANDARD TIME), and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a revised financial statement and statement of plant and equipment with their bid.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, N. J., and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 139, State Highway Office Building, 1035 Parkway Avenue, Trenton, N. J. Bids must be made upon the standard proposal forms in the manner designated in the standard State Highway specifications and must be delivered in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

Signed: R. J. Abbott
State Highway Commissioner

Bids: March 14, 1951 (351)

Heated Room in Building No. 138

THE PORT OF NEW YORK AUTHORITY
PORT NEWARK
CONTRACT PN-140.001

Sealed proposals for the construction of a heated room in Building No. 138 at Port Newark will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 8th Ave., N. Y. 11, until 2 P.M. Wednesday, March 14, 1951, and thereafter in the Auditorium of the Authority at the same address until 2:45 P.M., on the same date, at which latter time and place said proposals will be publicly opened and read.

Contract documents may be seen at the office of the Chief Engineer and copies will be furnished upon deposit of $25 per set. The deposit will be remitted if the documents are returned in good condition, not later than 30 days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman.
New York, March 1, 191.

OFFICIAL PROPOSALS

Bids: March 23, 1951 (354)

Water Filtration Plant and Pipe Lines
Filter Equipment
Steel Standpipe

THE VILLAGE OF HIGHLAND FALLS,
ORANGE COUNTY, NEW YORK

Sealed proposals will be received at the Village Hall, Highland Falls, New York, until 8:00 P. M., Eastern Standard Time, March 23, 1951, for furnishing all necessary labor, materials and equipment and performing all work for the construction of a Water Filtration Plant and pipe lines, filter equipment and steel standpipe and will there be publicly opened and read aloud.

Separate proposals will be received upon the three parts of the project as follows:

1 million gallon per day rapid sand filtration plant including filter building, settling basin, aerator, piping to, from and through the plant to the limits defined on the plans, together with valves and all necessary appurtenances, pumping equipment, standpipe foundations, etc.

Filter equipment for 1 million gallon per day capacity to the limits defined.

Steel standpipe of 500,000 gallon capacity erected on foundations furnished by others.

Proposals shall be accompanied by certified check in accordance with provisions contained in the specifications in an amount of five per cent (5%) of the base bid.

Copies of the Contract Documents, including plans and specifications, may be obtained at the office of Edna C. Gross, Village Clerk, Highland Falls, New York, upon payment of $25.00 for each set. Any bidder upon returning documents in good condition will be refunded his payment and any nonbidder will be refunded $15.00.

BOARD OF TRUSTEES OF THE
VILLAGE OF HIGHLAND FALLS,
ORANGE COUNTY, NEW YORK.
Chester H. Weyant, Mayor

Dated: February 5, 1951
Morrell Vrooman Engineers
Consulting Engineers
Gloversville, New York

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-3326) will be received by Bureau of Reclamation, Anderson Dam, Idaho, until March 20, 1951, and then publicly opened for furnishing labor and materials and performing all work for the construction of a 4,160-volt distribution line and distribution system and for the conversion of coal-fired furnaces to electrically heated furnaces for Anderson Ranch Government Camp, Boise Project, Idaho. The work is situated near Anderson Dam in the southwest part of Idaho. The work will consist of a 4-wire, wood-pole distribution line approximately 2.2 mi. long; electrical distribution system to provide street lighting and single- and 2-phase power to approximately 20 buildings; conversion of house heating furnaces; and other work. Completion of work is desired in 120 days. For particulars, address Bureau of Reclamation, Anderson Dam, Idaho; or Building 1-A, Denver Federal Center, Denver, Colorado. (355)

NEW ORLEANS DISTRICT, CORPS OF ENGINEERS, Foot of Prytania Street, New Orleans, La.—Sealed bids will be received in this office until 11:00 a.m., CST, 21 March 1951, and then publicly opened for construction of spillway, outlet structures, dike and dam closure of Texarkana Dam, Bowie and Cass Counties, Texas, New Orleans District. The principal features involved are approximately 50,000 cubic yards of concrete; 74,000 barrels of cement; 4,290,000 pounds of reinforcing steel; 3,700 lineal feet of drainage relief wells; 70,100 cubic yards of riprap; 3,570,000 cubic yards of excavation; and 2,000,000 cubic yards of compacted embankment. Further information on application. (322)

(Continued on page 69)

READ THE OFFICIAL PROPOSAL COLUMNS OF
ENGINEERING NEWS-RECORD
THIS WEEK AND EVERY WEEK

U. S. Government
(Continued from page 68)

COMMONWEALTH OF MASSACHUSETTS. Department of Public Works. NOTICE TO CONTRACTORS: Sealed proposals for constructing a single and double deck elevated highway structure with approaches (a section of the Boston Central Artery) in the City of BOSTON (Charlestown) will be received at Room 427, 100 Nashua Street, Boston, Mass., until 12 o'clock noon of Tuesday, March 20, 1951, and at that place and time publicly opened and read. Plans and proposal forms; $50.00, amount returnable only to bidders who return plans in good condition within three days ater opening of bids. Proposal guaranty: $150,000. Minimum wage rates have been established. Complete information at office of Department. Right reserved to waive any informality in or reject any or all proposals. An award will not be made to a Contractor who is not equipped to undertake and complete the work. By: WILLIAM F. CALLAHAN, Commissioner of Public Works.
February 17, 1951. **(346)**

OFFICIAL PROPOSALS

Bids: March 23, 1951 **(345)**

Sneads Branch Relief Drain—Section "B" and Laterals

Sealed Bids will be received by the Louisville and Jefferson County Metropolitan Sewer District at its office at 414 West Jefferson Street, Louisville, Kentucky, until 12 o'clock noon, Friday, March 23, 1951, for the construction of the Sneads Branch Relief Drain-Section "B" and Laterals.

The Contract will provide for the construction of approximately the following:

11'-0" Semi-Elliptical Drain, in Tunnel	1655 feet
7'-0" Semi-Elliptical Drain or 90° Circ. Precast Pipe, in Tunnel	165 feet
7'-6" Semi-Elliptical Drain or 90° Circ. Precast Pipe, in Open Cut	1213 feet
6'-6" Semi-Elliptical Drain or 78° Circ. Precast Pipe, in Tunnel	500 feet
6'-6" Semi-Elliptical Drain or 78° Circ. Precast Pipe, in Open Cut alternate with Tunnel	910 feet
60" Circular Drain, in Tunnel	178 feet
21" Circular Drain, in Tunnel	28 feet
21" Circular Drain, in open cut	552 feet
30" Circular Drain, in Tunnel	30 feet
30" Circular Drain, in open cut	590 feet

In addition to the 5821 feet of Drain to be constructed, will be two (2) junction chambers, manholes and five (5) relief chambers.

Plans, Specifications and Information for Bidders will be furnished to prospective bidders upon deposit of $50.00 on or after February 23, 1951. This deposit will be refunded upon the return of Plans and Specifications after the Contract is awarded.

Each bid must be accompanied by a certified check drawn on a Louisville or New York Bank payable to the District in the amount of $35,000.

The right is reserved to reject any or all bids or waive any informality in any bid and to accept any proposal considered by the District to be on the whole, the best.

NORVIN E. GREEN
Chairman of the Board
MORRIS FORMAN
Chief Engineer

Bids: March 15, 1951 **(336)**

Superstructure & Substructure

Sealed proposals will be received by The City of Dunbar, a municipal corporation, by The Bridge Commission of the City of Dunbar, Kanawha County, West Virginia, at the offices of said Commission on the first floor of the City Hall, Dunbar, West Virginia, until 8:00 o'clock P. M. (EST) on the 15th day of March, 1951, and said bids will be publicly opened and read aloud immediately thereafter in the Council Chamber in the City Hall.

For the construction of the following projects:

A steel superstructure consisting of 2-225 ft., 1-450 truss span, and 1-198 ft. 2 span continuous girder. All complete with handrail, flooring and lighting.

Substructure concrete abutments, piers and approaches.

All proposals shall be a bidder's bond in amount of 5% of total bid.

Plans, specifications and proposal forms may be obtained from C. P. Fortney, Consulting Engineer, 206 Union Building, Charleston, West Virginia.

The Bridge Commission reserves the right to reject any or all proposals or to defer the awarding of the contract.
2/12/51 H. G. Robinson, Chairman

OFFICIAL PROPOSALS

Bids: March 7, 1951 **(339)**

State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with federal aid funds, sealed proposals will be received until tenthirty o'clock A.M., eastern standard time on the 7th day of March, 1951, by Henry A. Cohen, Director, Bureau of Contracts & Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the Construction of the following project in Erie County.

Contract No.	Name	Miles
FAOT31-1	Ontario Thruway	1.93 Cont.
FARC31-4	(William St. to Walden Ave.)	0.70 Access
FAST31-1	Broadway-Depew, S.H. 914 William Street, Co. Rd. 207 Project No. UI-1071(7)	

Type: 9"-2 Crse Cem. Conc. Pavt 2 at 37' Wide = 1.57 mi.
Misc. Work = 0.03 mi.
Asp. Conc. Opt. = 0.33 mi.
(2 Crse. Cem. Conc. Pvvt. on Access = 0.70 mi.)
Hy. Sep. 3 Sp. Alpha I-Beam 143' Total Hy. Sep. 4 Sp. Alpha I-Beam 196 Total R.R. Sep. 12 Sp. Alpha I-Beam 1026.84' Total R.R. Sep. 4 Sp. I-Beam 196 Total
Alpha Royalty = $4,048.00

Estimated Deposit: $200,000 Cost of Work: $3,790,000
Plans $50

Maps, plans, specifications, and estimates may be obtained at the office of the Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the office of the District Engineer, C. R. Waters, State Office Bldg., Buffalo 2, N. Y. and may be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Proposal for contract must be submitted in a sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check payable to the order of "State of New York, Commissioner of Taxation & Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders". When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

The right is reserved to reject any or all bids.

B. D. TALLAMY
Supt. of Public Works

Bids: July 2, 1951 **(348)**

Steel Pipeline(s) and Associated Works

DEPARTMENT OF THE CO-ORDINATOR-GENERAL OF PUBLC WORKS, BRISBANE, QUEENSLAND, AUSTRALIA
TULLY FALLS HYDRO-ELECTRIC PROJECT
SPECIFICATION NO. TF/5

Tenders closing at Noon on the 2nd July, 1951 at the Office of the undersigned, are invited for the manufacture, supply, delivery and erection of

(a) a steel pipeline (No. 1) and associated works

and alternatively

(b) the penstock system complete comprising pipelines Nos. 1 and 2 and associated works

for the Tully Falls Hydro-Electric Project in North Queensland.

Particulars may be obtained from Australian Consulate-General, 636 Fifth Avenue, New York 20, New York, from whom copies of plans and specifications are available on payment of a sum of Two Dollars and Twenty-four cents ($2.24). Cheques should be made payable to "Commonwealth of Australia".

The lowest or any tender will not necsarily be accepted.

Tenders should be endorsed "Tender—Hydro-Electric Project, Steel Pipeline and Associated Works"

C. E. PETERSEN
SECRETARY
DEPARTMENT OF THE CO-ORDINATOR-GENERAL OF PUBLIC WORKS
Box 185C, G. P. O.,
BRISBANE, Queensland, Australia

Bids: July 2, 1951 **(347)**

Pressure Tunnel and Surge Tank

DEPARTMENT OF THE CO-ORDINATOR-GENERAL OF PUBLIC WORKS, BRISBANE, QUEENSLAND, AUSTRALIA
TULLY FALLS HYDRO-ELECTRIC PROJECT
SPECIFICATION NO. TF/6

Tenders closing at Noon on the 2nd July, 1951, at the Office of the undersigned are invited for the construction of a pressure tunnel and surge tank for the Tully Falls Hydro-Electric Project in North Queensland.

Particulars may be obtained from Australian Consulate-General, 636 Fifth Avenue, New York 20, New York, from whom copies of plans and specifications are available on payment of a sum of Two Dollars and Twenty-Four cents ($2.24). Cheques should be made payable to "Commonwealth of Australia".

The lowest or any tender will not necessarily be accepted.

Tenders should be endorsed "Tender—Hydro-Electric Project, Pressure Tunnel and Surge Tank".

C. E. PETERSEN
SECRETARY
DEPARTMENT OF THE CO-ORDINATOR-GENERAL OF PUBLIC WORKS
Box 185C, G. P. O.,
BRISBANE, Queensland, Australia

Bids: March 8, 1951 **(328)**

Runway, Taxiway & Apron of Airport

PUERTO RICO TRANSPORTATION AUTHORITY
ENGINEERING DIVISION

The Puerto Rico Transportation Authority will receive sealed bids for Pavement of Runway, Taxiways and Apron of the Puerto Rico International Airport, Project No. 9-53-001-103, San Juan, Puerto Rico, until 2:00 P. M. (Atlantic Standard Time) on the 8th day of March, 1951, at San Juan, Puerto Rico, at which time and place all bids will be publicly opened and read aloud.

The successful bidder will be required to furnish satisfactory performance and payment bond or bonds.

All bids shall be based on wage rates not less than the minimum wage rates as predetermined by the Secretary of Labor of the United States, schedule of which is included in the Specifications.

Attention is called to the fact that the project is exempted from the 3% Insular Tax on public work contracts.

Proposed forms of contract documents, including plans and specifications, are on file at the office of the Chief Engineer of the Puerto Rico Transportation Authority, at San Juan, Puerto Rico.

Copies of the documents may be obtained by depositing one hundred dollars ($100.00) with the Puerto Rico Transportation Authority for each set of documents so obtained. The amount of the deposit will be refunded to each person who submits formal proposal and returns sets in good condition within ten (10) days after the opening of bids.

However ninety dollars ($90.00) only will be refunded to bona-fide Bidders for extra sets returned and those taking sets and not filing formal proposals.

A set of drawings and specifications will be available for inspection at the Civil Aeronautics Administration Office at 50 7th St. N. E., Atlanta 5, Georgia.

The Puerto Rico Transportation Authority reserves the right to reject any or all bids and waive any informalities in bidding.

A certified check or bank draft payable to the Puerto Rico Transportation Authority, U. S. Government Bonds, or a satisfactory bid bond executed by the bidder and acceptable sureties in an amount equal to (5%) five per cent of the bid shall be submitted with each bid.

José Feliciano
Acting General Manager

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Construction Engineers
Craft Supervisors

Key Supervisory Construction personnel needed in connection with long term Latin American Industrial Construction Program. Craft Supervisors required for electrical, piping, welding and mechanical installation.

Ability to speak Spanish and experience in Latin America essential.

Send complete record of experience and education with first letter. Also give date available and state salary requirement.

P-8955, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

ENGINEER

WATER CONDITIONING

Leading engineering manufacturing company in metropolitan area has opening for graduate engineer. 30-35 years with 8-10 years experience in the field of engineering, selection, estimating, proposals, and sales assistants relating to water conditioning equipment and methods.

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WORTH 4-4400 EXT. 585
FOR APPOINTMENT

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Graduate mechanical engineers or equivalent, experienced, for permanent work in plant engineering dept., organic chemical plant. Salary commensurate with experience. Contact personnel superintendent.

Celanese Corporation of America
BOX 148 BISHOP, TEXAS

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Wanted, by national organization, for Middle-Atlantic location, graduate engineer, thoroughly experienced in plant engineering and maintenance. Must be free to travel. Give age, details of experience, salary expected, and when available for work. Write **Box EN 128, 221 W. 41 St., N. Y.**

DESIGNERS, DRAFTSMEN, ELECTRICAL - MECHANICAL - STRUCTURAL. JOB LOCATED IN MIDDLE WEST. EXCELLENT WORKING CONDITIONS. GOOD SALARY. OLD ESTABLISHED COMPANY.

P-9011, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

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Broadway Maintenance Corp.
22 - 09 Bridge Plaza North,
Long Island City 1, New York
Att: Electrical Construction Div.

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FOR BRANCH OF CATERPILLAR DEALER. OUR EMPLOYEES KNOW OF THIS AD.

P-8981, Engineering News-Record
330 W. 42 St., New York 18, N. Y.

WANTED ENGINEER

Assistant to Chief Engineer for engineering department of substantial California manufacturer of Road Building Machinery.
Experience in asphalt plants, batching plants, dryers, or kindred equipment desirable.
Excellent opportunity in a rapidly expanding organization.

P-8956, Engineering News-Record
68 Post Street, San Francisco 4, Calif.

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Engineers experienced in the design and construction of water works needed for $38,000,000 project. Starting salary $4,382, $5,204, $5,736, $6,586 per year with annual increases. Submit resume of experience with application request.

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1501 Water Board Building
735 Randolph Street, Detroit 26, Michigan

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610 Smithfield Street Pittsburgh 22, Penna.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

CIVIL SERVICE

STRUCTURAL ENGINEERS for checking building plans, etc. Salary $4600 to $6400. Permanent, with Civil Service benefits. Apply, Department of Inspection, Room 100, District Building, Washington, D. C.

SANITARY CHEMIST — The Water Pollution Commission, State of Delaware, desires to employ a Sanitary Chemist with experience in conducting and interpreting chemical, physical and bacteriological examinations of sewage, industrial wastes, surface and ground waters. Submit written statement setting forth age, education and experience to Dr. F. I. Hudson, Executive Officer, Water Pollution Commission, Dover, Delaware.

WANTED, ENGINEER, Structural or Mechanical to advise in preparation of plans, review drawings, supervise and inspect construction, etc. State experience, age and salary required. Address the Commissioner, Tennessee Department of Public Health, 426-6th Avenue North, Nashville, Tennessee.

CIVIL ENGINEER with special experience in design of municipal structures and utilities. Position as principal design engineer available, City of 20,000 in the East. Please give education and experience background, salary requirement, and availability for work. CS-9020, Engineering News-Record.

POSITIONS VACANT

ENGINEERS WANTED for industrial fire prevention field work by national insurance organization with offices in most major cities. These are permanent jobs with a real future, but candidates should appreciate that extensive away-from-home travel is involved. Age 26-40 preferred. P-8306, Engineering News-Record.

WANTED: STRUCTURAL Engineers, Mechanical Engineers and Industrial Architects; some defense work. Seelye, Stevenson & Value, 101 Park Avenue, New York, N. Y.

SUPERINTENDENT—MUST have experience on sewer construction preferably on deep sewers in soft ground requiring bracing. Write giving age, experience, education and salary expected. P-8951, Engineering News-Record.

SUPERINTENDENT—ONE who has had experience on bridge construction. Work would be in Pennsylvania, New Jersey, Delaware, or Maryland. Advise full details including salary, age, education and experience. P-8952, Engineering News-Record.

ROUGH GRADE Foreman, familiar with rock, heavy excavation. Good opportunity. Work in eastern part of New York State. Experience references. P-9049, Engineering News-Record.

SALARIED POSITIONS $3,500—$35,000

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POSITIONS VACANT

STRUCTURAL STEEL Detail Draftsmen and Checkers. All types of Structures. Vacation and bonus plan, group insurance, good working conditions. Only top quality men. Send complete written information. Samborn, Steketee and Associates, 1214 Cherry Street, Toledo 2, Ohio.

SALES ENGINEER: Experienced structural steel estimating desirous developing into sales work. Age 25 to 35 only. Junior estimator also needed. Permanent with long established Fabricator. Full particulars, salary expected, photo to P-8972, Engineering News-Record.

WANTED: EQUIPMENT Superintendent to supervise Contractor's Yard. Location — Houston. Give full information and photograph if possible. P-9059, Engineering News-Record.

BRIDGE DESIGNERS and Structural Draftsmen. Openings for both experienced men and recent graduates. Applicants should furnish complete information. Frank D. McEnteer, Consulting Engineer, Clarksburg, W. Va.

GENERAL SUPERINTENDENT for work in Eastern part of the Country, must be capable of supervising all phases of Highway construction. Reply stating age, experience and references. P-9052, Engineering News-Record.

WANTED A Carpenter foreman, familiar with all types of bridge work. Good opportunity with good concern. P-9063, Engineering News-Record.

WANTED MECHANIC, familiar with all types of heavy road equipment. Some ability to operate same. Work in central New York. Good opportunity for right person. P-9064, Engineering News-Record.

WANTED: STRUCTURAL Engineers for pulp and paper mill design including mill layout and structural steel and reinforced concrete design. In first letter give complete engineering experience, age, education, etc. Address Construction Engineer, P. O. Box 1844, Savannah, Ga.

ELECTRICAL ENGINEERS design and detail of industrial plants, power and lighting. Only experienced, qualified men will be considered. P-9056, Engineering News-Record.

MECHANICAL ENGINEERS design of heating and ventilating systems, industrial plumbing, utility piping. Only experienced, qualified men will be considered. P-9069, Engineering News-Record.

CIVIL ENGINEERS design of grading, paving, drainage and structures. Only experienced, qualified men will be considered. P-9070, Engineering News-Record.

POSITIONS WANTED

CIVIL ENGINEER, registered, 13 years experience in photogrammetry, topography, traverse, triangulation, property surveys, construction layout. Prefer small town location or within commuting distance. PW-8823, Engineering News-Record.

ENGINEER: GRADUATE C.E., registered, 20 years experience in plant and heavy construction. Also general engineering work. Desires permanent position commensurate with experience and qualifications. PW-8997, Engineering News-Record.

SUPERINTENDENT-ENGINEER, Trunk and Intercepter Sewers. Hard driving, executive type go-getter; now employed, available March 1st., go anywhere. Contact J. P., Post Office Box 7213, Tampa 3, Fla.

(Continued on page 72)

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C.E. Degree—15 years' Foreign and Domestic experience on Military and Heavy Construction Projects. Fluent Spanish. Willing to travel.

PW-9023, Engineering News-Record
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PW-9021, Engineering News-Record
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This work is in our Cleveland office, and is on a 5-day, 45-hour week basis, with time and one-half over 40 hrs; also, vacation and holiday pay. Steady employment and a good opportunity with a good organization.

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Please submit complete resume stating experience, education, salary required and availability date.

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Monthly payments permissible. Information sent without obligation. WRITE TODAY

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POSITIONS WANTED

(Continued from page 70)

CE., P.E.N.Y. 30. Veteran. 2 yrs. field and office for concrete constr. firm, 1½ yrs. field supervision for G. C. 1 yr. struct. design. 1 yr. with struct. steel fabricator. Presently employed. PW-9001, Engineering News-Record.

CHIEF STRUCTURAL. Project Engineer. M.S.C.E. degree, registered. 20 years experience design & construction hydro-electric dams, locks, buildings, chemical plants, desires position of responsibility. PW-9008, Engineering News-Record.

SUPERINTENDENT — WIDELY Experienced all forms of pressure grouting, dams and foundations, water-proofing. All forms stabilization work, structure solidification, cast-in, place piping etc. Desires permanent connection with progressive firm, ten years with present employer but desire to make change. Moderate salary or will consider profit sharing proposition. Competent Estimator. 44 years old, married, go anywhere. No boozer. PW-9028, Engineering News-Record.

SEWER CONSTRUCTION Foreman familiar with all types of machines and pipes; will go to any job lasting a years duration. PW-9013, Engineering News-Record.

LAWYER—I have had 1½ years of general practice. I am interested in position with construction organization. I have some knowledge of this field and a great deal of interest therein. I was Republican canditdate for State Assembly. Excellent references. PW-9018, Engineering News-Record.

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Patent Practice
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Consult: Z. H. Polachek
Reg. Patent Attorney, 1234 Broadway, New York 1, N. Y.

WANTED

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WW-9054, Engineering News-Record
330 W. 42 St., New York 18, N. Y.

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FS-9000, Engineering News-Record
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Worthington two-stage, water-cooled, vertical 250#, 60 CFM, new condition.

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Cedarapids BBB scalping unit with 1036 jaw.
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1½-ton Ford with any body.
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New and rebuilt dump bodies.
2,000 gallon tanks on semi-trailer mounting.
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Lorain 55B gas powered crane.
P&H Model 625A 15-ton crawler crane.
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P&H Model 150 ½ yd. truck crane on 6x4 Mack.

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P&H 203 shovel attachment.
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Lorain 40 Hi-Lift shovel attachment.
Bucyrus-Erie 1½-yd. rock bucket.
Koehring 301 dragline fairlead.
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Lorain 75 fairlead.

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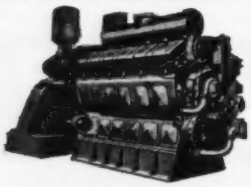

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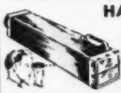

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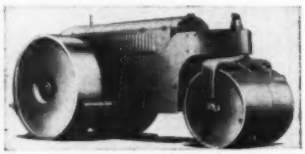

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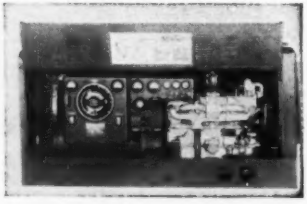
Reflective insulation

Type A Richflex consists of two sheets of Richflex-coated kraft paper bonded with asphalt. It is reinforced at the edges and center to provide nailing strips. Type B consists of one sheet of coated kraft bonded with asphalt to one sheet of plain kraft. Type C is a single sheet of kraft coated on both sides with Richflex. These Richflex insulators can be used in walls, ceilings, or under floors.—THE RICHKRAFT CO., 228 N. LASALLE ST., CHICAGO, ILL.

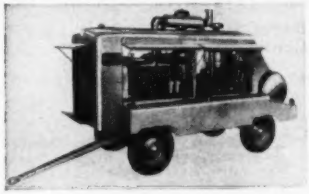


Gasoline-driven welder

Self-contained 300-amp arc welder can also serve as a 3-kw auxiliary power generator. Hinged side doors in the sheet-metal canopy provide access to control panels, engine, welding generator, and other parts. Power is provided by a 53.5-hp Chrysler 6-cyl engine. Welding generator is rated 40-v 300 amps under 1-hr resistance load at 1,500 rpm. Current range is 50 to 400 amp.—HOBART BROS. CO., HOBART SQUARE, TROY, OHIO.

Rust preventive

No-Rust No. 6 is recommended for protection of metal surfaces against corrosion in either indoor or outdoor exposure. It is a rust preventive of the thin-film type. Coverage is 390 sq ft/gal. It has good storage characteristics, and when applied, is stable under a temperature range of 0 to 190 F. Can be applied by brush, spray, or dip methods.—GULF OIL CORP., 722 GULF BLDG., PITTSBURGH 30, PA.



Portable air compressor

Rotary-type compressor delivers 600 actual cfm free air at 100 psi. Total weight of the Gyro-Flow 600 is 9,500 lb ready for use. Rotating-vane construction eliminates pistons, con rods,

(Continued on page 84)

COMBATING SEA and SEWAGE HAZARDS
BYERS WROUGHT IRON protects this outfall line

An early outfall line, still serving and in excellent condition after 38 trouble-free years, helped to write the specifications for a new outfall line recently installed by the Borough of Spring Lake, N.J. On the basis of this experience, wrought iron was selected for plus-protection against punishing corrosion encountered both from sea water, and from sewage.

Approximately 1350 feet long, this new outfall line was made up of 14 inch OD Byers Wrought Iron pipe, having a wall thickness of ½-inch. All joints were electrically welded and reinforced with 18 inch wrought iron sleeves, ½-inch thick, which were split and slipped over the pipe. As lengths were added, the line was pulled out to sea by a stationary hoist which had been set up on the beach line. Off-shore boats guided the outboard end of the pipe seaward. This installation was handled by Thomas Procter Co., specialists in outfall work.

WHY WROUGHT IRON LASTS

This notch-fracture test specimen illustrates the unusual fibrous structure of wrought iron which is responsible for the unusual corrosion and fatigue resistance of the material. Tiny fibers of glass-like silicate slag, distributed through the body of high-purity iron, distribute local strains, halt and disperse corrosive attack, and discourage pitting and penetration. They also anchor the initial protective scale, which shields the underlying metal.

Sewage outfall lines encounter severe corrosive conditions. Inside, sewage sets up an aggressive action, while salt water attacks the outside of the line. Add to this the abrasive action of sand and the constant stresses imposed by current, tide and the moving valleys that are carved in the ocean floor and you have a team of destructive forces that sends many an outfall to an early grave *unless* the right pipe is used for the service. Wrought iron has been used in a number of outfall applications, and established excellent durability records for this service.

Our bulletin, WROUGHT IRON FOR SEWAGE TREATMENT AND DISPOSAL INSTALLATIONS is yours for the asking.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Division: New York, N. Y.

BYERS

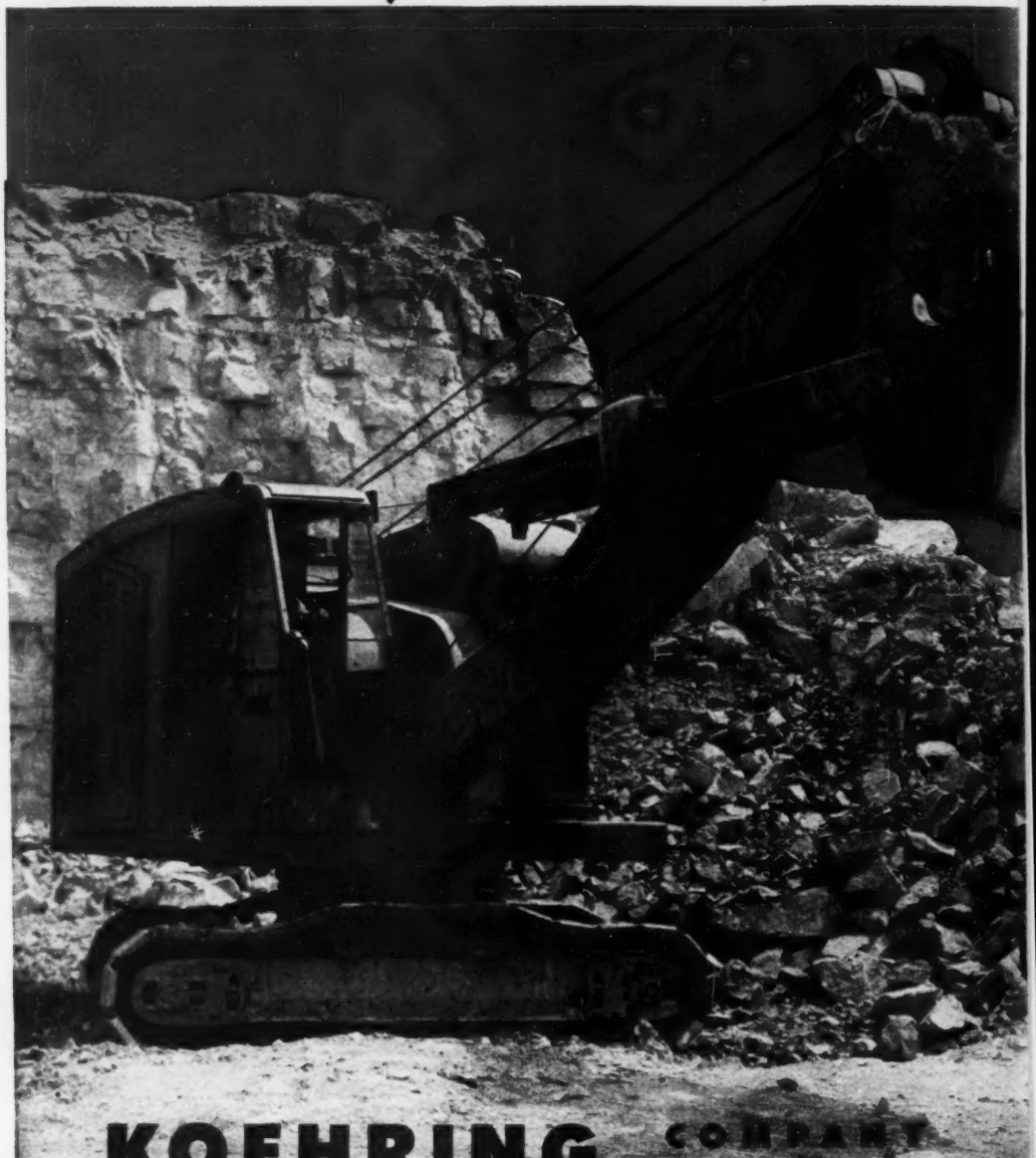
CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

When you compare



KOEHRING COMPANY
Milwaukee 16, Wis.

Subsidiaries: JOHNSON • KWIK-MIX • PARSONS

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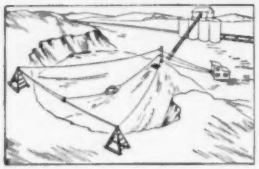
Ask your Koehring Distributor for specific information

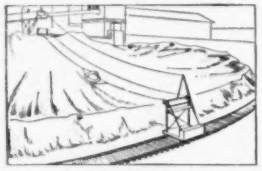
KOEHRING HEAVY DUTY

7¾ to 79½ TONS lift capacity . . . ⅛ to 2½ yards dipper capacity

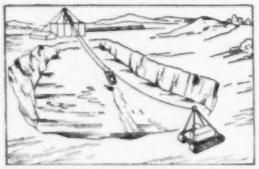
Sauerman Scraper stores and reclaims 150,000 tons of stone on ground between dock and cement mill.



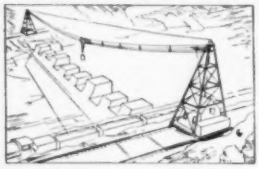
Sauerman Scraper Excavator



Sauerman Scraper Stockpiler



Sauerman Slackline Excavator



Sauerman Tautline Cableway

For more than forty years the main Sauerman business has been the designing and building of cable-operated excavators and conveyors that overcome the difficulties and reduce the costs of moving materials over large areas. Among the best known of these Sauerman machines are the following:

Drag Scraper Excavator—An economical machine for pit and hill excavation, rehandling industrial wastes, cleaning out ponds and general long range earthmoving. It is a powerful excavator and a rapid conveyor.

Drag Scraper Stockpiler—For bulk storage, Sauerman engineers have developed a series of drag scraper machines that make storing and reclaiming an easy one-man job. These machines are giving satisfaction in handling such diverse materials as coal, concrete aggregate, ore, salt, sugar, fertilizers, etc., both indoors and in the open.

Slackline Cableway Excavator—This unique machine has no equal for work that requires digging deep and far and conveying to a high delivery point. In a wet gravel pit, for instance, it reaches under water, comes up with a heaping load of gravel, and lifts its load to the top of the plant, delivering thirty to forty loads an hour.

Tautline Cableway—This is a long range aerial crane designed for all jobs of lifting, conveying and placing loads of unwieldly materials. It is standard equipment for engineering contractors who use it to span the site of a dam, concrete bridge or a similar project and to handle all the materials of construction.

Other Sauerman Machines—Sauerman also builds Tower Excavators and Scraper-Loaders for work requiring machines that move along as they dig; also Power Rakes and Grapples for handling massive materials.

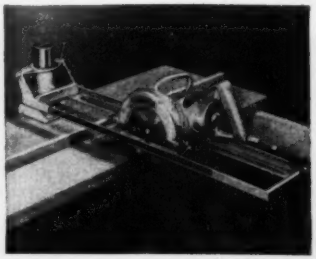
Literature—Tell us which of the above machines interests you and we will send concise, easy-to-read catalogs giving you detailed information.

SAUERMAN BROS., Inc.

532 S. Clinton St., Chicago 7, Illinois

Cableway and Scraper Specialists Since 1909

valves, and the need for a clutch. Power is provided by a GM Series 71 diesel. Eight-hour-capacity fuel tanks are standard equipment.—INGERSOLL-RAND CO., 11 BROADWAY, NEW YORK 4, N. Y.

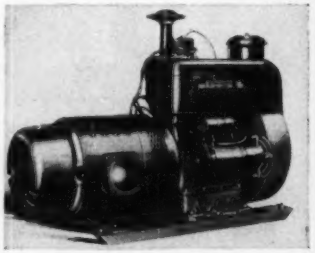


Portable saw guide

Electric saw is quickly converted to a portable radial saw using the Skil saw-guide. Weighing 26 lb, it is easily attached to a small platform on two saw horses. It is made for use with the Models 77, 825, 87 Skilsaws, and other makes having a base-width capacity of 4⅛ to 5⅛ in. The Saw-Guide has a radial range of 120 deg (60 deg right or left) and a bevel capacity of 45 deg. Maximum cut-off capacity is 17 in. Maximum ripping width is 28 in. — SKILSAW, INC., 5033 ELSTON AVE., CHICAGO 30, ILL.

Masonry waterproofer

Siliphane compound (silicone base) is said to make porous masonry walls water-repellent. This transparent material can be brushed or sprayed on exterior, above-grade masonry walls of all types. Siliphane is said to penetrate deeply, coating the masonry with a microscopically thin water-repellent film.—PRIMA PRODUCTS, INC., 10 E. 40TH ST., NEW YORK 17, N. Y.



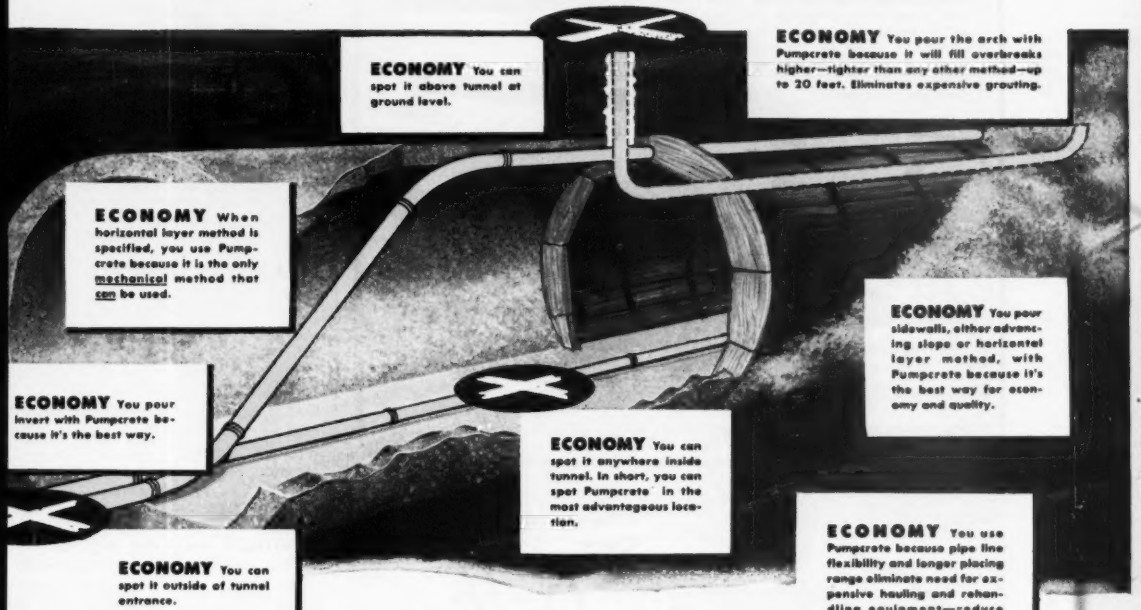
Electric plants

G-line plants are available in 300, 600, and 1,000-w capacities with Briggs & Stratton engines; and in 1,500, 3,000, 5,000, and 10,000-w sizes powered by Wisconsin engines. The G-line can be used for stand-by

(*Continued on page 86*)

follow the spots...

FOR LOW COST, HIGH QUALITY TUNNEL LINING WITH PUMPCRETE!®



ECONOMY You can spot it above tunnel at ground level.

ECONOMY You pour the arch with Pumpcrete because it will fill overbreaks higher—tighter than any other method—up to 20 feet. Eliminates expensive grouting.

ECONOMY When horizontal layer method is specified, you use Pumpcrete because it is the only mechanical method that can be used.

ECONOMY You pour sidewalls, either advancing slope or horizontal layer method, with Pumpcrete because it's the best way for economy and quality.

ECONOMY You pour invert with Pumpcrete because it's the best way.

ECONOMY You can spot it anywhere inside tunnel. In short, you can spot Pumpcrete in the most advantageous location.

ECONOMY You can spot it outside of tunnel entrance.

ECONOMY You use Pumpcrete because pipe line flexibility and longer placing range eliminate need for expensive hauling and rehandling equipment—reduce labor requirements.

PUMPCRETE MEANS QUALITY— ASSURES A BETTER STRUCTURE . . .

QUALITY 1—Pumpcrete does not segregate concrete.

QUALITY 2—Pumpcrete is the only method that places sidewall concrete in horizontal layers without chuting or dropping of concrete.

QUALITY 3—Pumpcrete will handle stiffer mixes.

QUALITY 4—Pumpcrete reduces loss of slump between pump and point of placement.

QUALITY 5—Pumpcrete will fill overbreaks higher—tighter than any other method—up to 20 feet.

QUALITY 6—Pumpcrete assures a continuous flow of concrete to the forms . . . thereby eliminating many cold joints and related imperfections.

QUALITY 7—Pumpcrete is the only method that assures a tightly lined tunnel without need for grouting.

Ask your Rex distributor for the complete Pumpcrete story

BEFORE YOU LINE YOUR TUNNEL, SAVE MONEY BY ASKING TO SEE THE CHAIN BELT COMPANY'S EXCLUSIVE NEW FILM ON UNDERGROUND CONCRETE PLACEMENT.

CHAIN BELT COMPANY, 1633 W. Bruce St., Milwaukee 4, Wis.

CHAIN BELT COMPANY REX CONSTRUCTION MACHINERY

CUT YOUR CONCRETE FINISHING COSTS!

Strike off, vibrate, float and finish in one fast operation

Made in widths of 6′ to 36′ the new Master Vibratory Finishing Screed (Cat. No. 596) lets you use harsher, more economical mixes. Yet you get a denser, more accurate, harder-wearing concrete surface. With a Master, vibrations penetrate the entire depth and width of the concrete slab. No additional vibration needed regardless of concrete slump or amount of reinforcing steel. Write, wire or phone for prices, specifications, complete information.

Master Vibratory Finishing Screed

Master Turn-A-Trowel—For floating and finishing concrete floors. 34" and 48" diam. Gasoline or electric power. Instant change of trowels for floating or finishing—an exclusive Master feature. (Cat. No. 685)

Combination Disc Float and Turn-A-Trowel

Floats concrete and asphalt mastic floors with a high-speed 24" disc. Grinds floors with 16" or 22" disc. Easily converted to Turn-A-Trowel by substituting trowels for disc.

MASTER VIBRATOR COMPANY • 101 Davis Ave. • Dayton 1, Ohio

FLOORS CAN BE

FOR LONG LASTING, HEAVY DUTY
DRIVEWAYS
TRUCKING AISLES
INDUSTRIAL FLOORS
AND THE LIKE

Specify

"ARMOURING"
TRADE MARK

THE ORIGINAL STEEL MESH FLOOR SURFACE REINFORCEMENT
SHOCK-PROOF
WEAR-PROOF
CRACK-PROOF

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IRVING SUBWAY GRATING CO., INC.
5063 27th St., Long Island City 1, N. Y.
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Drilling

CORE BORINGS for Foundations, Dams, Bridges and all Heavy Structures
GROUT HOLES

Tinney Drilling Co.
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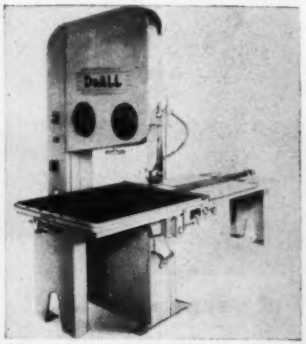
"GUNITE"
NEW CONSTRUCTION AND REPAIRS
• Prestressed Tanks
• Repair all Types Disintegrated Concrete
• Light Reconstruction and Repairs
• Linings and Replugs to Reservoirs, Stacks, Bunkers, Sewers, Tanks, Tunnels, Pen Stocks
• Structural Steel Encasements
• Restoration of Masonry Structures
NATIONWIDE OPERATIONS—EXPERIENCED PERSONNEL
Write for our new 48 page Bulletin
PRESSURE CONCRETE CO.
"Gunite" Contractors and Engineers

or continuous duty. Various models are available in each size, in ac or dc, with complete range of voltages, cycles, phases, and with manual or remote electric starting.—WINPOWER MFG. CO., NEWTON, IOWA.



Hydro-Feed band saw

Model HP-36 bandsawing machine uses standard saw bands up to 1-in. wide. Throat capacity is 36 in.; work height, from 15¼ in. up. Power is provided by a 10-hp motor. Tool speed range is 40 to 10,000 fpm. Correct feed pressure is automatically controlled by resistance of the work. The saw will cut through steel, wood, plastics, and other materials.—THE DOALL CO., DES PLAINES, ILL.

Overload warning signal

Overload safety device automatically emits a shrill klaxon signal and lights a red warning lamp when crane or hoist loads exceed a predetermined limit. This unit consists of a U-shaped pressure bar and a sensitive microswitch. Entirely self-contained, power is provided by two flashlight batteries. Over-all dimensions are 8¼x5x14¾ in. Gross weight is 16 lb.—W. C. DILLON & CO., INC., 1421 S. CIRCLE AVE., FOREST PARK, ILL.

Rubber re-vitalizer

Plasticizer is said to prolong the life of rubber parts and surfaces that have hardened, cracked, or become inelastic with age. Rub-R-Vive is a non-inflammable and non-volatile liquid that can be applied by cloth or brush. It is available in pint, quart, and gallon cans.—SCHWARTZ CHEMICAL CO., INC., 326 W. 70TH ST., NEW YORK 23, N. Y.

Tube and pipe fittings

Corrosion-resistant fittings are designed to simplify tube and pipe installations. The Speedline insert flange

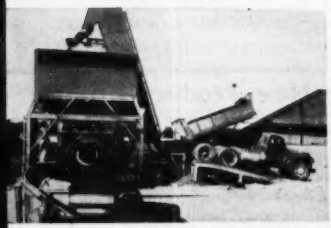
(*Continued* on page 88)

ERIE Portable Concrete Plant on Housing Project near Pittsburgh

This plant was towed from Erie to Pittsburgh in about 5 hours and set up on the site of a large housing project.—Wheels were removed and plant was set up as a stationary concrete mixing plant. 1 yard batches of specification concrete delivered to houses by "Dumpcrete" trucks. All concrete required on this project was provided by this Erie Portable Concrete Plant.

Move Your **CONCRETE PLANT** *from Job to Job and produce up to* **40 CU. YARDS PER HOUR**

In Illinois

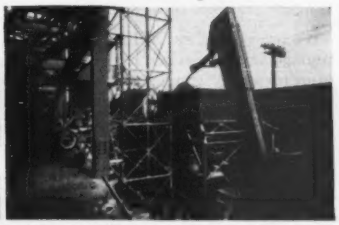


This Erie Portable Concrete Plant, electric motor driven, is set up in a town of 10,000 population to supply concrete within a 16 mile radius. Steam heating makes it possible to operate all year and sales up to 100 yards a day are recorded without taxing the full capacity of the plant.

In Transit

The above Erie Portable is being towed 100 miles to make concrete on a series of building projects. 2 men can get it into operation within 60 minutes and it can be "knocked down" for towing in less time. Booklet SP1 gives complete specifications. Write for copy.

In New York



This Erie Portable Concrete Plant is completing here a 6000 cu. yard concrete job and has since been moved to three building sites in Buffalo. Consult with Erie for complete details on the Erie Portable Concrete Plant as applied to your concrete project.

ERIE

STEEL CONSTRUCTION COMPANY

113 GEIST ROAD • ERIE, PENNSYLVANIA

JOINS 'EM RIGHT KEEPS 'EM TIGHT

The COMPLETE Victaulic System is the EASIEST WAY TO MAKE ENDS MEET! Victaulic offers a complete line of Full-Flow Elbows, Tees and other fittings, all carefully designed for free-flowing efficiency and leak-tight dependability.

Join 'em right — the Victaulic way — and you'll be sure of easy, quick hook-ups. Pipe ends are joined by a simple two-bolt coupling. A speed or T-wrench is the only tool required. AND Victaulic Couplings keep 'em tight ... pipe joints stay positive-locked, leak-proof. Victaulic Couplings are designed to stand up under extreme pressure, vacuum, or strain conditions.

Preparing those pipe ends is a cinch the Victaulic way ..."Vic-Groover" grooves 'em automatically in a jiffy, more than twice as fast as a conventional pipe threader!

SAVE time, work, and dollars on your piping construction and maintenance. JOIN UP with Victaulic.

Make your next piping job ALL VICTAULIC. Write today for Victaulic Catalog and Engineering Manual No. 44-8D.

NOTE VIC'S NEW COMBINED MAIN OFFICE AND PLANT ADDRESS BELOW—

VICTAULIC COMPANY OF AMERICA
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Mailing Address: Box 509, Elizabeth, N. J.
Phone: Elizabeth 2-3640
Victaulic Inc., 727 W. 7th St., Los Angeles 14, Calif.
Victaulic Company of Canada, Ltd., 406 Hopewell Ave., Toronto 10
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27TH VICTAULIC YEAR

The easiest way to make ends meet
VICTAULIC
PIPE COUPLINGS AND FITTINGS

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combines strength at the connection and corrosion resistance throughout the internal area. Advantages claimed include: Assembly does not have to be heat treated; pipe cutting is simplified —thickness of a gasket is the only allowance that must be made; and an expanding tool and plain wrench are the only tools required. Available in sizes from ¼ through 6 in. Other Speedline fittings include an aligning connector and low-cost union.—HORACE T. POTTS CO., ERIE AVE. & D ST., PHILADELPHIA 34, PA.

Demand-oxygen unit

Self-contained demand-type oxygen unit provides emergency treatment of smoke inhalation, carbon-monoxide inhalation, heart failure, and other applications requiring oxygen. Opening the cylinder valve and placing the facepiece on the patient causes the unit to administer oxygen automatically as the patient's breathing requires it.—MINE SAFETY APPLIANCES CO., BRADDOCK, THOMAS & MEADE STS., PITTSBURGH 8, PA.

New Product Briefs

Flexible tubing of stainless steel is available for use where extreme temperatures and corrosion are factors. Developed by: Allied Metal Hose Co., Long Island City 1, N. Y.

Recessed convector unit is designed to combine maximum heating efficiency with nice appearance. Made by: Brown Products Co., Forest Hills, N. Y.

Air-entraining agent in liquid form is available in 5-gal pails or 55-gal drums. It is added at the mixer with the water. Air-Crete is produced by: Carter-Waters, Kansas City 8, Mo.

Dust collector, powered by a 3-hp motor, has a 9-ft roll-away bin. Suction capacity of the 20B30 is 2,405 cfm on a 7-in. pipe. Maker: Aget-Detroit Co., Ann Arbor, Mich.

GOW SOIL BORINGS BY Raymond

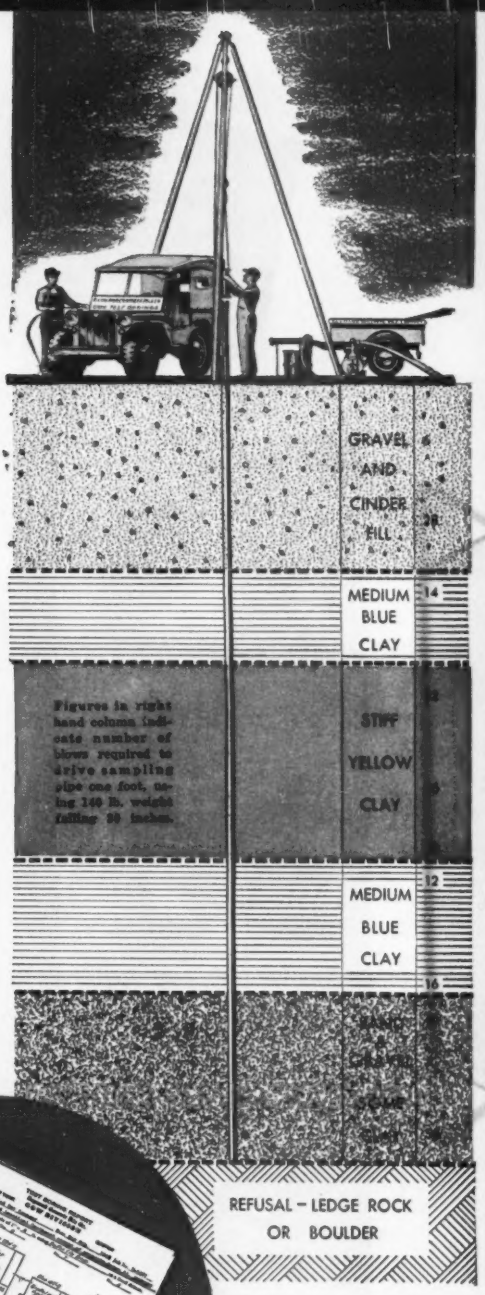
Carefully made soil investigations are of great value to Owners, Architects and Engineers in the selection of building sites and the determination of proper structural foundations.

Specify dependable Gow borings by Raymond and you will secure information that will supply the basis for sound engineering decisions.

Their low cost will surprise you.

• • •

THE SCOPE OF RAYMOND'S ACTIVITIES includes, in addition to borings for soil investigation, every recognized type of foundation construction—concrete, composite, precast, steel, pipe and wood piles. Also caissons, underpinning, construction involving shore protection, shipbuilding facilities, harbor and river improvements, and cement mortar lining of oil and water pipe lines 4" to 144" in diameter by the Centriline Corporation, a Raymond subsidiary.



Figures in right hand column indicate number of blows required to drive sampling pipe one foot, using 140 lb. weight falling 30 inches.

GOW DIVISION

Raymond

CONCRETE PILE CO.

140 Cedar Street, New York 6, N. Y.

BRANCH OFFICES:

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Washington • Pittsburgh • Atlanta • Miami
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For Utmost Security

IMPORTANT AMERICAN CITIES INSTALL

LOCK JOINT

CONCRETE PRESSURE PIPE

More than anyone else, those responsible for supplying water for domestic or industrial use appreciate the value of pipe lines which provide these four freedoms:

Freedom from:

- ★ Rupture or blow-out
- ★ Maintenance and repairs
- ★ Loss of carrying capacity
- ★ Corrosion or deterioration

The water works man who installs Lock Joint Concrete Pressure Pipe will have trouble-free pipe lines. The careful design of Lock Joint Pressure Pipe does not permit blow-out or rupture; its dense concrete walls are immune to tuberculation, corrosion or electrolytic attack; and its useful life has been estimated by competent hydraulic engineers at more than 100 years. Among Lock Joint's strongest supporters are the water works officials who have installed this type of pipe and who point to it as the most economical in their systems.

• • •

If you are quality minded yet cost conscious, specify Lock Joint Pressure Pipe, secure in the knowledge that you are receiving the best value the pipe industry can provide.

LOCK JOINT Reinforced Concrete PRESSURE PIPE

LOCK JOINT PIPE COMPANY
Est. 1905
P. O. Box 269, East Orange, N. J.
Pressure Pipe Plants: Wharton, N. J., Turner, Kan., Detroit, Mich.

BRANCH OFFICES: Cheyenne, Wyo. Casper, Wyo. • Denver, Col. • Kansas City, Mo. Valley Park, Mo. • Wichita, Kan. • Chicago, Ill. Rock Island, Ill. • Kenilworth, N. J. • Hartford, Conn. • Tucumcari, N. Mex. • Tulsa, Okla. Oklahoma City, Okla. • Beloit, Wis. • Hato Rey, P. R.

SCOPE OF SERVICES—Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply and Distribution Mains in a wide range of diameters as well as Concrete Pipes of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous Lines.

MANUFACTURERS' PUBLICATIONS

Electrical fittings—Solderless wire connectors, cable and conduit fittings, and wiring devices are listed in Catalog 1050 (12 pp). Feature of the catalog is a description of the pre-SURE-connector tool. The catalog contains complete specifications, dimensional data, application instructions, and ordering information.—BUCHANAN ELECTRICAL PRODUCTS CORP., 1290 CENTRAL AVE., HILLSIDE, N. J.

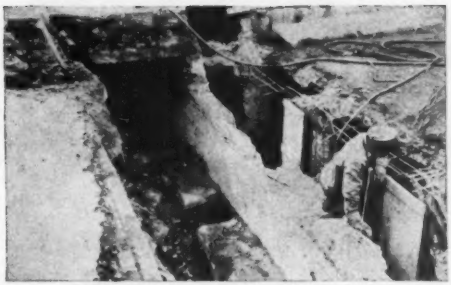
Volumetric chlorinizer—High-capacity Model HCVS visible-flow chlorinizer is described in a bulletin listing its principal features. This unit meters chlorine at rates to 6,000 lb per 24 hr. Bulletin 840-G27 contains a cutaway drawing showing functioning parts, and a readable diagram showing operation of the chlorinizer. Also included is a discussion of operation of the rate-of-flow indicator, low maintenance costs, and installation.—BUILDERS-PROVIDENCE, INC., 345 HARRIS AVE., PROVIDENCE 9, R. I.

Carbide tools—Catalog GT-250 (60 pp) contains complete information on the Carboloy line of carbide tools and parts. It tells how to select and apply these tools; lists the differences and limitations of various grades of carbide; and describes non-tool uses for carbides. A pictorial index divides the catalog into sections to simplify its use. Available technical literature is also listed and described.—CARBOLOY CO., INC., E. EIGHT MILE ROAD & VAN DYKE, DETROIT 32, MICH.

Vinyl-plastic coatings—Bulletin describes a line of coatings for control of corrosion on exteriors of steel, concrete, brick, formed block, plywood, and tank linings. Specific properties are listed; a chemical-resistance chart is included; and information is supplied on applications. These coatings have a thermoplastic resin base, are inert, non-contaminating, and will stand up under extreme conditions.—CASEY & CASE COATING CO., P. O. BOX 151, MAYWOOD, CALIF.

Architectural stainless steel—Illustrated booklet (32 pp) is designed to familiarize engineers and contractors with successful applications of stainless steel. More than 75 photographs of stainless steel installations and stainless components are featured. Design details are listed in 10 pages of drawings. Metallurgy of the metal and the

(*Continued on page 94*)



CEMENT GUN CO. RESTORES BRIDGE

Photo above shows the disintegrated condition of an abutment on a reinforced concrete bridge in a large Western Pennsylvania city. Repair work on this structure necessitated an almost complete rebuilding of the abutment. To accomplish this, the end span was jacked up and new expansion plates were placed at the bridge seats. In addition to repair of abutments—beams, girders, and arch ribs were reintegrated with "GUNITE" wherever disintegration had taken place.

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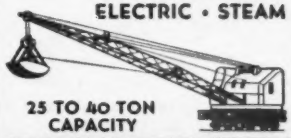

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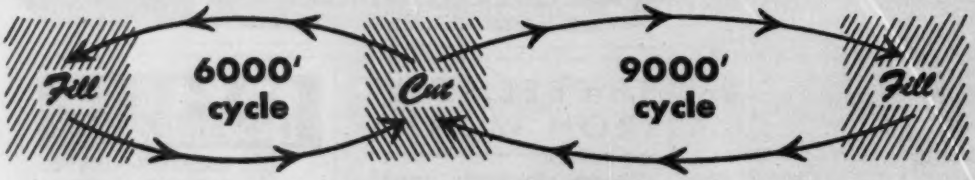

Carl Bolander & Sons Company, of Minneapolis, put dirtmoving on a high-speed basis when they re-graded the Chicago Great Western Railroad right-of-way a mile south of Kenyon, Minnesota. With 19,000 cubic yards of heavy, boulder-laden clay to move on hauls of 1/2 to 4/5 of a mile one-way, they drove in 2 high-speed, electric-control C Tournapulls and 1 rubber-tired, 186 h.p. C Tournadozer.

Build fill at both ends of cut

High-speed Tournadozer, used primarily as a pusher, helped each Tournapull load 10 pay yards of damp, loamy clay in approximately 1 minute. Hauling in a "figure-8" pattern, the Tournapulls spread alternately on two fills . . . the first fill, 4500 ft. north of the cut; the second fill, 3000 ft. south of the cut. Each rig completed the 9000-ft. cycle in an average of 8.6 minutes . . . the 6000' cycle in 6.7 minutes . . . averaged 7.8 trips hourly on the two hauls. That's 78 pay yards per hour per unit . . . or a combined output of 156 yards hourly for the 2 Tournapulls.

Average 17.5 m.p.h. between jobs

Both the Tournapulls and the Tournadozer showed a lot of other speed advantages which the contractors liked. When Bolander started the job, the 3 LeTourneau rubber-tired rigs drove down from Minneapolis, where they had just finished grading a parking lot. The Tournapulls made the 70-mile trip through main highway traffic in just 4 hours driving time . . . the Tournadozer took exactly 6 hours for the same distance.

On the job or driving job-to-job, Tournapull's and Tournadozer's fast, rubber-tired speeds paid off for Bolander & Sons in a big way. You'll like the production and economy these job-proved rigs can give you, too. Your LeTourneau Distributor is ready to show you job-proved facts and figures on both rigs. Call him TODAY!

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Schrader's rubber-tired C Tournadozer was a big factor in helping maintain this high production record. Its 186 h.p. "push", synchronized with Tournapull's 186 h.p. "pull", consistently put 10 pay yards of damp loam and clay into the scraper bowl in 60 seconds. Loading distance averaged 125 ft.

When not in use for pusher-loading, Tournadozer handled small fill assignments. Above, Tournadozer tucks fill material around culvert . . . driving over tracks wherever necessary . . . and shuttling back and forth between production and utility jobs in spare time at speeds up to 19 m.p.h.

Tournapull, Tournadozer—Trademark Reg. U.S. Pat. Off. C144

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forms in which it is supplied commercially are covered with sufficient detail to answer most questions.—AMERICAN IRON & STEEL INSTITUTE, 350 FIFTH AVE., NEW YORK 1, N. Y.

Heavy-duty diesel tractors—Two 16-p catalogs describe the Model HD-9 and the Model HD-15 diesel crawler tractors. Each catalog utilizes double-page spreads to discuss major features such as unit construction, GM 2-cycle diesel power, complete power train, frame and track design, simplicity of operation, and ease of maintenance. Both make extensive use of large illustrations of the two units and their components. Complete specifications, plus details of allied equipment and special accessories, are also included.—ALLIS-CHALMERS MFG. CO., TRACTOR DIV., BOX 512, MILWAUKEE, WIS.

Bitumuls for airfields—Information on airfield planning, construction, paving, and maintenance is contained in this descriptive folder. This booklet is not intended as a construction manual. Subjects listed include: Location and planning; mixtures; surface treatments and paving; uses of bitumuls; improvements; and C. A. A. airport design standards and construction specification references. Detailed data on construction is contained in the "Bitumuls Handbook" and other manuals available from the company.—East of the Rockies: AMERICAN BITUMULS CO.; West of the Rockies: STANCAL ASPHALT & BITUMULS CO. Both companies are located at: 200 BUSH ST., SAN FRANCISCO 4, CALIF.

Water-well systems—Forty-eight-page catalog contains photographs and drawings illustrating the Layne methods of drilling deep water wells. Subjects covered are under-reamed gravel wall wells, rock wells, and special drilling, such as core sampling for foundation soundings. The booklet also shows applications of Layne shutter screens and Layne pumps. Water conditioning section completes a story of the scope of Layne service. Useful engineering tables are included.—LAYNE & BOWLER, INC., MEMPHIS 8, TENN.

Hydraulic dozers—Bulldozers, Gradebuilders, and root rippers for Allis-Chalmers' tractors are described in Engineering Bulletin 894. Design and performance characteristics are described in detail. Features listed include direct lift, positive down pressure, mobile moldboard, fingertip control, positive hydraulic hold, and easy engine accessibility. Complete specifications are listed.—THE BAKER MFG. CO., SPRINGFIELD, ILL.

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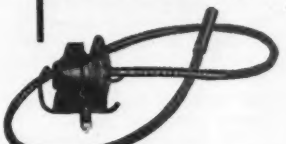

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Letter from SACRAMENTO

With the first meeting of five Sacramento, Calif., citizens early in January, redevelopment of blighted areas here is nearer realization.

The five were appointed by the city council as members of the redevelopment agency established in accordance with state law. Federal law (National Housing Act of 1949) will become involved when the agency seeks fund grants.

The Sacramento redevelopment plans show that:

(1) Smaller cities can undertake such work, and

(2) Private capital can be utilized with emphasis on smaller investors as compared with larger life-insurance-company-type backers.

It's a paying proposition too. Studies indicate that increased property taxes due to higher assessed valuation will completely pay off the city's investment in only six years after full development. We'll discuss that more completely later.

When the redevelopment agency was set up the city designated a 50-block area between the state capitol grounds and the Sacramento River as priority No. 1 for redevelopment.

A basic plan was developed by the city planning commission with the aid of architectural and economic consultants. In accordance with state law, information was compiled showing need for the project. This was presented in three reports with redevelopment plans.

• **Cost figures first**—The procedure from here out will be, first, to establish more closely the cost involved (federal funds are available for such work). Then the city must arrange to finance its share. A bond issue is preferred: Redevelopment is such a blue chip operation due to increased property values that state law permits bonding in excess of normal limitations.

With city funds assured, a federal loan will be available to purchase all the property to be redeveloped in the area.

The area may be divided into ten projects. A capitol mall is proposed—a broad divided boulevard between the state capitol building and the river to be flanked by state, federal, city and county office buildings and fine hotels and apartments. This capitol mall might well be project number one.

• **Existing buildings out**—Almost all existing buildings will be leveled at each site as it is made ready for redevelopment. This will require adequate permanent or temporary housing for individuals living within the area. Then the property will be sold in parcels suitable for development according to a plan drawn up by the agency and approved by the city council.

Under normal conditions, redevelopment of the 50-block area on a project by project basis would take about ten years. With the emergency conditions now prevailing, it will obviously take longer. In fact, except for possible emergency housing or office space, all work will probably be deferred until conditions become more stabilized.

It is expected that resale of the land will be at a loss of about $6,600,000 (1950 prices). The federal government will provide two-thirds of this amount. The city must put up one-third.

Studies show that a 30-year, 2% $2,500,000 bond issue will handle it. But, after full development it is estimated that property tax revenue will be $406,918 annually as compared with the present $114,534—the increase due to higher assessed valuation of the real estate.

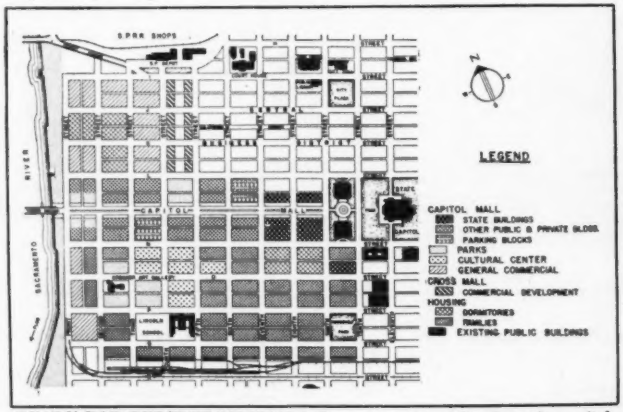
• **Need for rebuilding**—The 50 blocks involved is along the Sacramento River waterfront where the city first developed during gold rush days, 100 years ago.

The 50 blocks are the heart of an area closely surveyed during the report-making process. This survey area includes only 8% of the city's total expense but includes 20% of the population, 26% of the building fires, produces 36% of the juvenile delinquency, 42% of the adult crime and 76% of the tuberculosis cases.

Due to such substandard conditions, the Sacramento fire, police and health departments spent $175,000 more in the survey areas in 1949 than was collected in property taxes.

Another of these reports would leave certain existing office, church, hotel and historical buildings that meet standards. In the remaining area, 17 blocks would be for family housing, two for multistory department buildings, two for hotels, three for tourist river front motels and restaurants, seven for parks, one for wholesale produce markets, three for single men's transit dormatories, six for commercial and private office buildings, and three for international bazaars and restaurants. Most of these would be privately financed.

• **Credits**—The reports were prepared under the general supervision of Glenn Hall, planning engineer for the Sacramento City Planning Commission. Outside consultants on some of the work included Richard J. Neutra and Robert E. Alexander as architectural consultants and Harold F. Wise as economic consultant.



READY FOR REDEVELOPMENT is Sacramento, especially along the capitol mall and riverfront, an area of about 50 blocks. Planned for the future are ten projects to be financed by municipal bond issue and private money.

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"Thirteen years is a lot for a machine, and we beat it badly. It was a good old machine." That's what Marx Fall, Superintendent Department of Public Works, said about the MICHIGAN ⅜ yd. truck hoe owned by the city for thirteen years.

The City of Birmingham now operates a new MICHIGAN S-4 ½ yd. truck hoe which works 48 hours a week trenching for water and sewer connections, much of the time in blue clay. Operator Tom Griffin said: "It operates easily and against other ½ yd. machines our MICHIGAN ditches faster. It's easier to drive, too."

Mr. Fall added: "We need the rubber tired mobility and the truck speed of the MICHIGAN. Its short wheel base is particularly good for our work."

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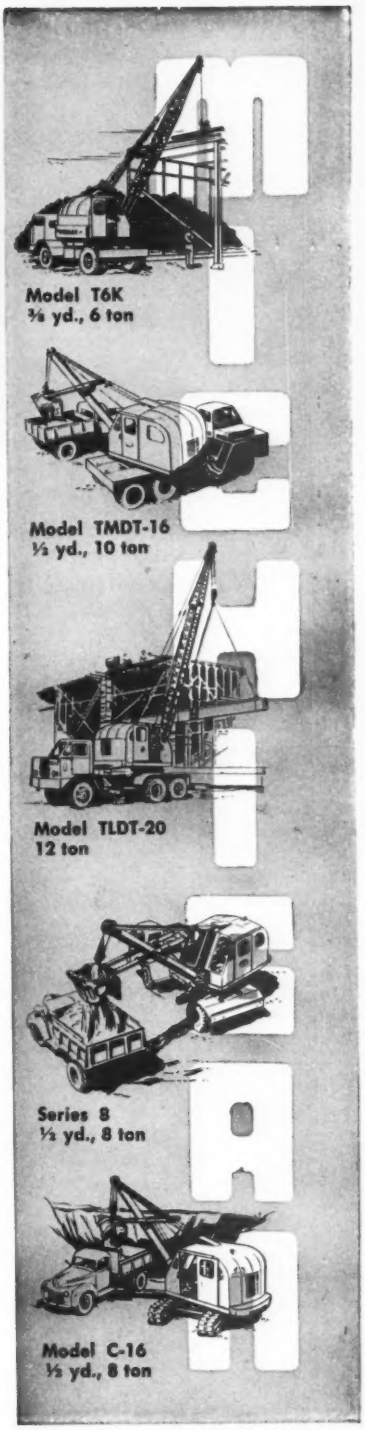

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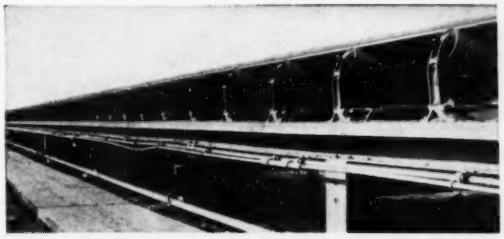

1200 foot Stephens-Adamson conveyor has 2000 ton per hour capacity. Uses 42 inch belt at speed of 500 feet per minute. Has Timken bearings in idlers.

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